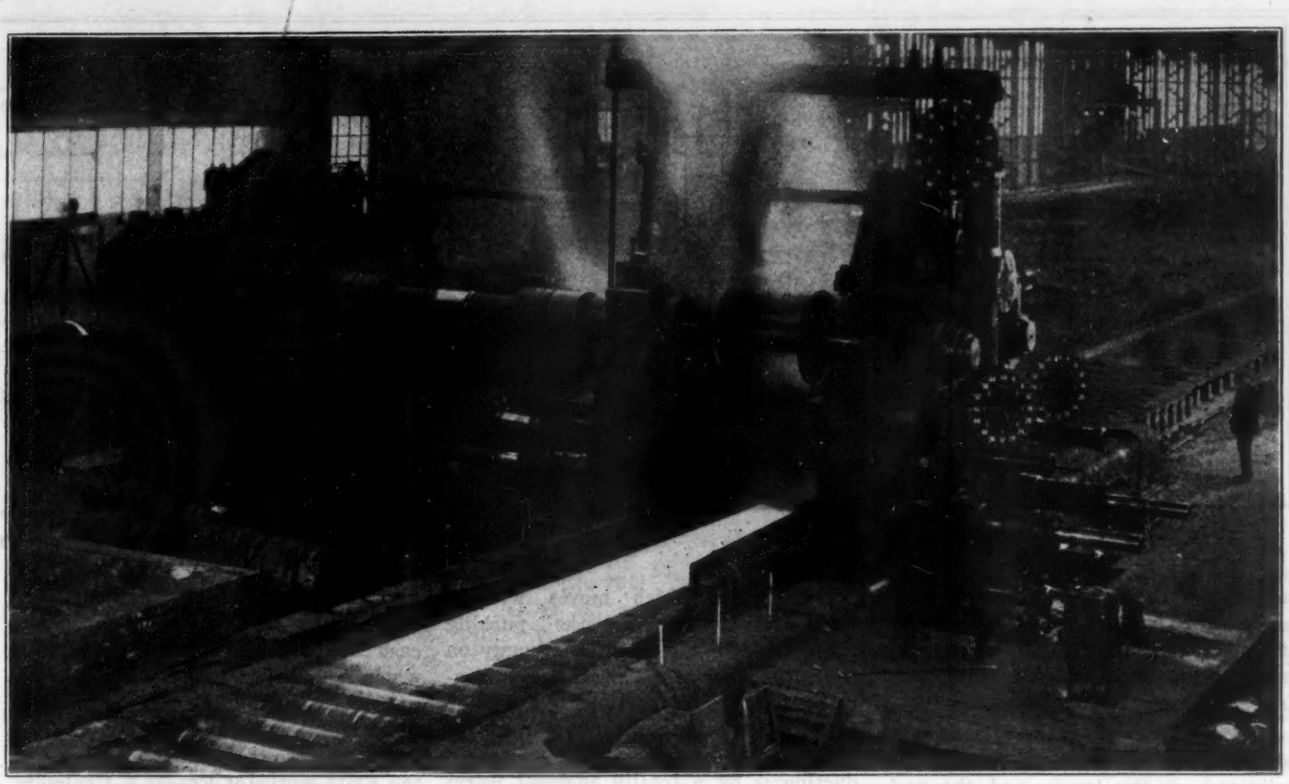


Fig. 1—This 34-inch plate mill is reported to be the largest universal rolling mill in Great Britain. It is particularly massive in construction

Completes Large Universal Plate Mill in Great Britain

By Joseph Horton

British Correspondent, Iron Trade Review

A PLATE mill recently completed and placed in operation at the Moss End Works of Stewart & Lloyds, Ltd., Clydesdale, Glasgow, Scotland, is said to be the largest universal rolling mill in Great Britain. The installation was engineered by Fraser & Chalmers, a subsidiary of the General Electric Co., Ltd., London. Stewart & Lloyds, Ltd., is one of the largest pipe and tube making interests in Europe, with plants in various parts of Great Britain.

The plant includes complete equipment and auxiliaries for placing of the slab on the ingot conveyor to machinery for delivering finished plate at the other end of the plant, and occupies a floor space of 80 x 900 feet. All this mechanical equipment, embodying the latest American practice, was designed by the Mackintosh-Hemphill Co., Pittsburgh, and was supplied through Fraser & Chalmers.

Primarily, the plant is designed for manufacturing universal plate in various widths up to 48 inches, with rolled edges, but can also produce plates up to 86-inch finished width and 1½-inch thickness with sheared edges. The layout enables plates up to 150-foot length to be rolled. The horizontal rolls are 34 inches in diameter, two-high reversing, and the four vertical rolls are 26⅝ inches diameter.

Operation of the mill commences at the furnace end of the slab buggy track with the placing of the slab on the slab buggy in a horizontal position. The buggy is rope-hauled on a track to the mill tables along the track in Fig. 2. The electric haulage gear is situated in a pit entirely below the floor level and incorporates an ingenious method of keeping a straight lead on the haulage rope. This is accomplished by a screw thread cut in the drum shaft with a pitch equal to the spacing of the grooves on the rope drum. One of the bearings has corresponding internal threads and so

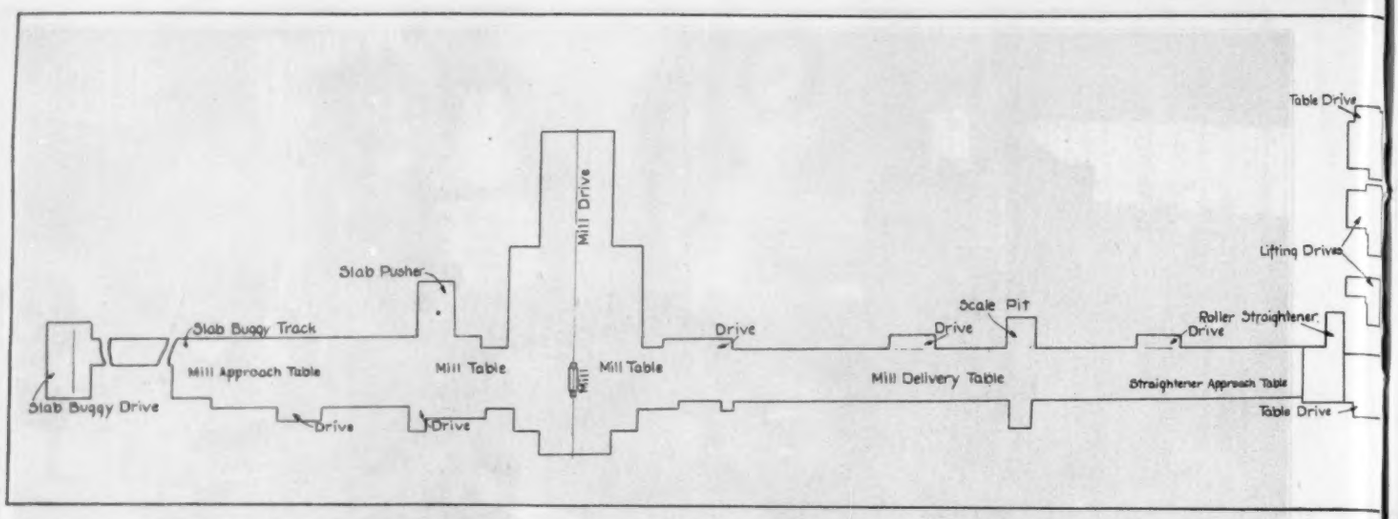


Fig. 2—As may be seen from this layout of the universal plat mill the

moves the drum and shaft sideways as the rope winds on or off. All the drive gearing is of cast steel, with machine-cut teeth and all shaft bearings are ring oiling.

A tension device, with a deadweight adjustment, is housed in a pit at the mill end of the track, and the endless rope system is used, the rope being clamped to the framework of the buggy. The buggy is built up, with cast steel frame and ends, cast iron wearing plates on the top and cast steel wheels. The slab is removed from the buggy by an electrically-operated pusher, situated at the side of the buggy track. This pusher has steel arms, with a renewable hinged pusher head, which moves with a horizontal travel on the pushing stroke, and lifts clear of the buggy on the return stroke. This action is continuous, it being possible to run the motor all the time without danger, as over-running is impossible. Speed reduction is by a totally enclosed worm gear. The whole arrangement is compact and accessible.

The mill table receives the slab from the pusher on five special rollers with tapered ends. All rollers on this table are of cast steel, with shafts cast integral, an unusual construction in British practice. All roller bearings are ring oiled. The table is in two parts, each part being carried on a massive beam. The bearings and oil bath for the side shaft gears are cast integral with these beams, the whole table being exceptionally massive in construction. Each casting for these large beams weighs over 16 tons, and all were cast and machined at the Erith works of Fraser & Chalmers. The protection afforded to the working parts as shown in the photograph will be appreciated, and the strength of the job can be well seen.

Two 85-horsepower motors coupled to one pinion shaft drive the rollers. All the drive gearing and also the miter gears for the rollers are machine-cut from the solid, in cast steel. The need for providing a greater

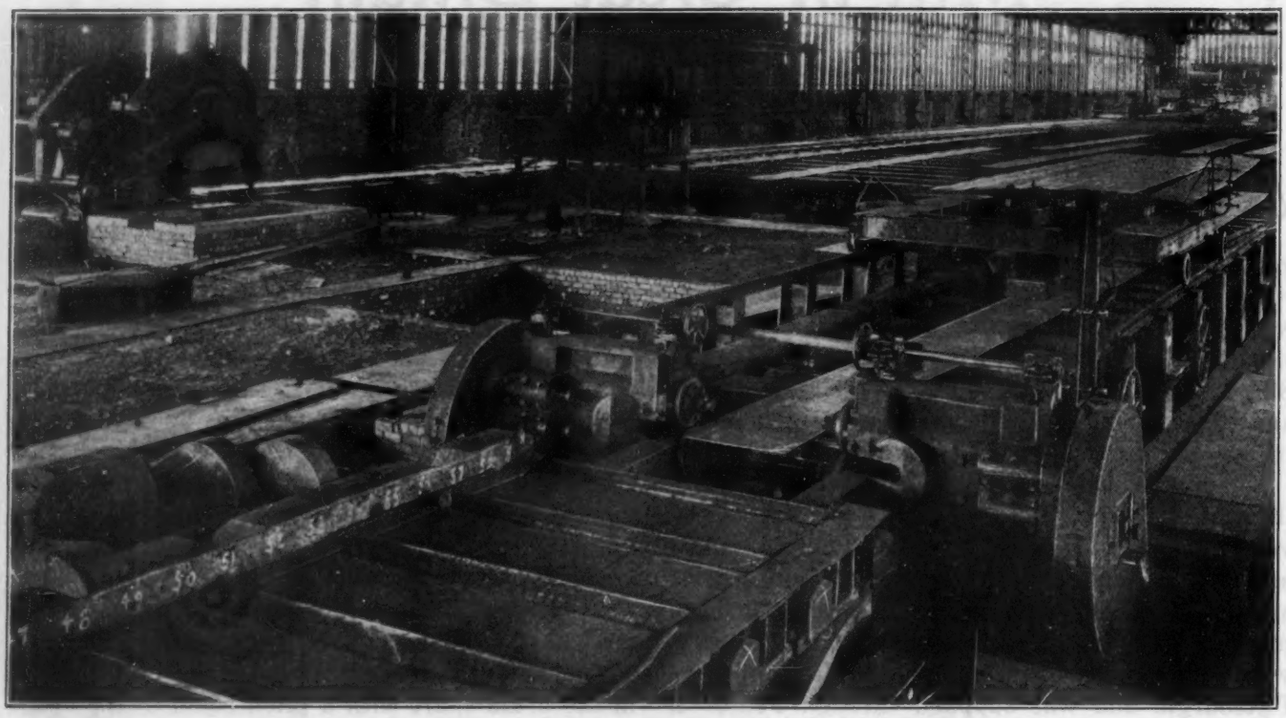
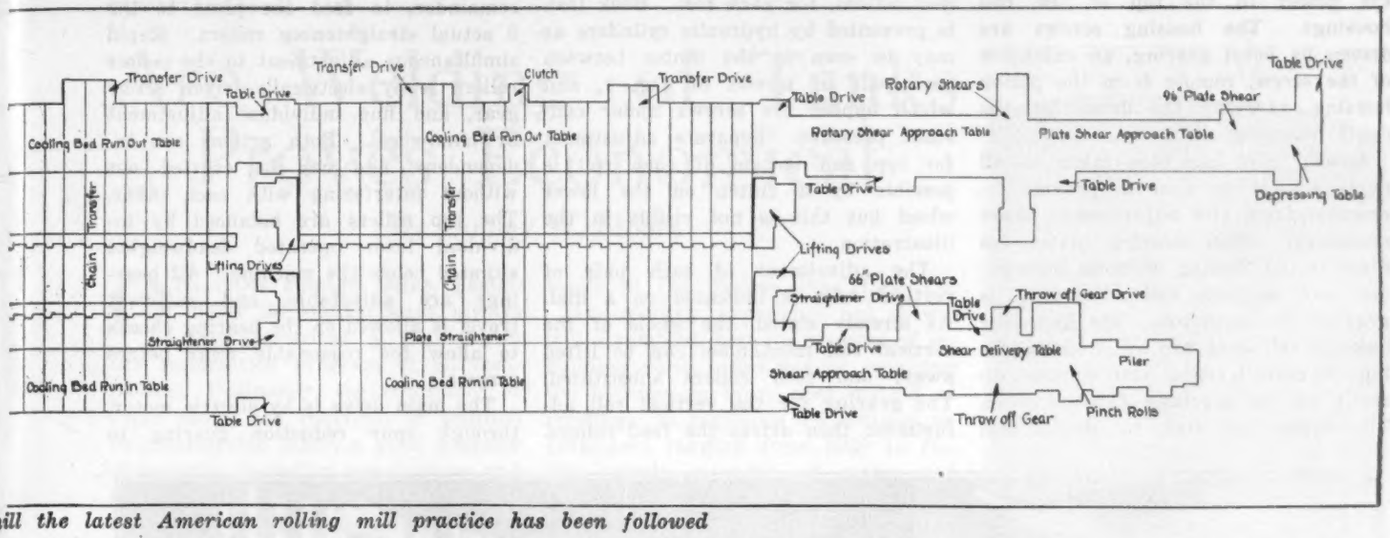


Fig. 3—Plates up to 86 inches wide can be cut on these rotary shears. A scale which is mounted above the machine indicates directly the width of the cut



mill the latest American rolling mill practice has been followed

length of roller table when rolling long pieces is met by an extension table, of somewhat lighter construction than the mill tables. The supporting beams in the case are broad flange rolled steel joists, machined along their entire length for the fitting of separate bearings for the rollers. These joists are supported at intervals on cast iron stands, which also carry the bearings for the side driving shafts.

An idea of the massive construction throughout is gained from Fig. 1. Although the design appears complicated when compared with the ordinary rolling mill, this complication is more apparent than real. This is best realized by considering that the mill stand really represents three rolling mills in one unit, and when these three mills are separated, each will be seen to consist of the usual parts and adjustments. In actual practice, the vertical rolls with all their attendant mechanism can be lifted away entire, leaving a simple two-high reversing plate mill, which will operate as such, and, in place of the vertical roll units, feed table units are placed in position complete, these feed tables being driven by the same mechanism which drives the vertical roll adjustment. This gear drops automatically in position, when either vertical rolls or feed tables are in use. As the vertical roll mechanism and the feed tables are each of unit construction, the change can be made rapidly and with good facility.

Horizontal rolls and mechanism follow pretty generally the usual practice; but a notable exception is found on the spindles, which are mounted at each end on bronze bushed universal joints of patented construction. Both spindles are balanced, the top spindle moving with the top roll, and both spindle balance beams are spring-supported in white metal bearings protected by dust caps. The rolls are of special cast iron supported in cast steel chocks lined with antifriction metal, with separate adjustment to each carrier. The horizontal screw-down motor is mounted on the pinion housing cap, an extended shaft with universal joints at each end carrying

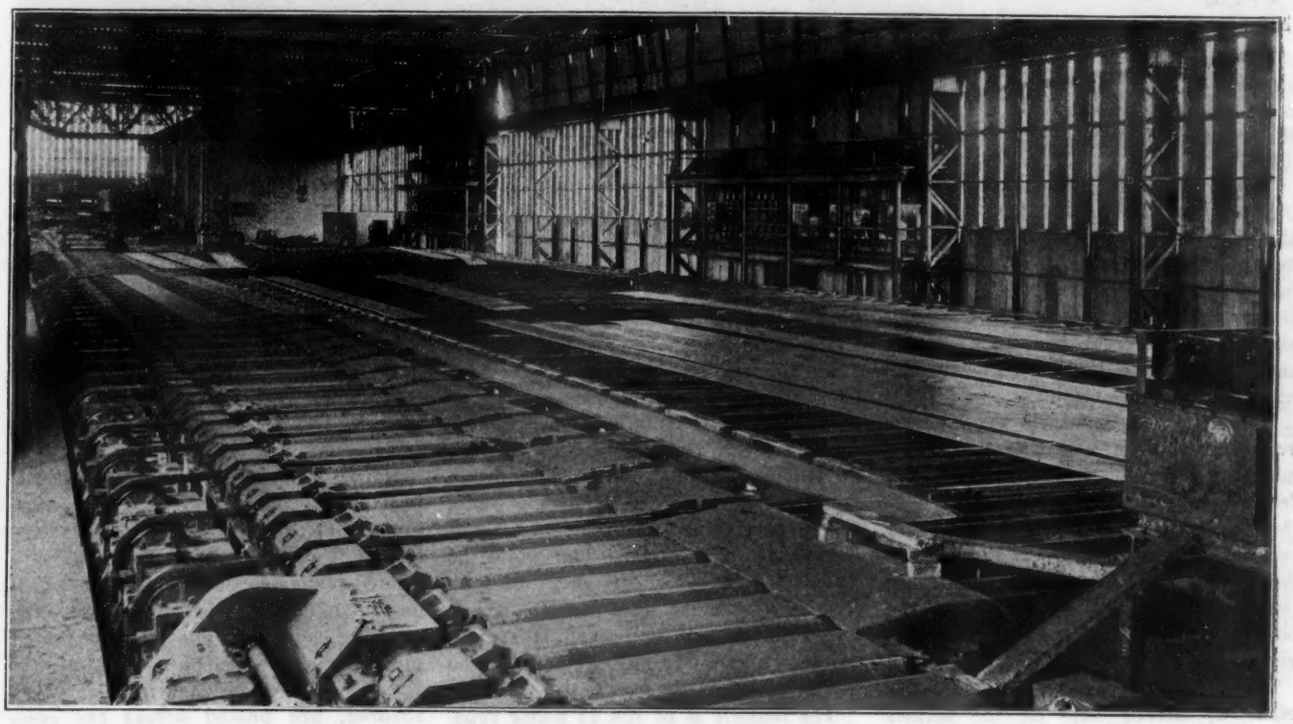


Fig. 4.—Construction of the cooling bed is such that the plates cannot become marked or scored from rubbing as they are moved along by the chains

the power to the top of the roll housings. The housing screws are driven by bevel gearing, an extension of the screw, remote from the pinion housing, carrying the drum for the draft indicator.

Special care has been taken in all parts subject to wear to provide renewable faces and adjustments where necessary. Steel wearing plates are fitted in the housing windows throughout, and separate end adjustment is provided for each roll. The hydraulic balance cylinders are situated on the top of each housing and operate directly on the overhead balance beam. The supporting rods to chocks and spindle beams can be seen in the illustrations.

The vertical rolls and their operating mechanism, is supported on massive detachable beams between the housings, and are driven by an overhead shaft on each side of the mill. Between the pinions and the overhead shaft are universal couplings of the same type as those used for the horizontal rolls.

The large bevel wheels driving the vertical rolls are a sliding fit on the main drive shaft, and are driven by feather keys, sunk into and secured to the drive shaft. In addition to being secured by set screws, these keys are dovetailed into the shaft leaving no possibility of trouble. The large bevels are machine cut, as are all the gears on this mill.

Adjustment of the vertical rolls is made by driven nuts on the screws seen projecting through the housing at each end of the mill—one at top and bottom, for each roll. Back lash is prevented by hydraulic cylinders as may be seen in the center between each pair of screws in Fig. 1, and which oppose the screws under constant pressure. Separate adjustment for top and bottom of each roll is possible by a clutch on the lower wheel but this is not visible in the illustration.

The adjustment of each pair of vertical rolls is indicated on a dial. As already stated, the whole of the vertical roll mechanism can be lifted away, and feed rollers substituted. The gearing for the vertical roll adjustment then drives the feed rollers. The unit construction of these tables is to be noted specially in Fig. 1. There are no troublesome pins or bolts to engage while lowering the unit into place. The outgoing mill table is a duplicate of the receiving side in every particular, except that ordinary parallel rollers are used throughout in its construction.

From this point the plate travels to the straightening machine, or mangle, as it is usually termed, which takes out all the waves and cockles, by rollers arranged alternately above and below, bearing hard on the plate, the pressure and the amount of bending being adjustable. The plate as it leaves the machine is flat, but may not have straight and parallel edges, and in this case will need treatment in the straightening presses to be described later.

The mangle is of the 11 roller type, the rollers at each end being somewhat more widely spaced than the remainder, to feed the plate to the 9 actual straightening rollers. Rapid simultaneous adjustment to the center rollers is by electrically-driven screw gear, and fine individual adjustment by handwheel. Both actions are independent, and can be carried out without interfering with each other. The top rollers are balanced by individual lever operated deadweights situated below the machine. All bearings are adjustable, and sufficient travel is allowed on the bearing chocks to allow for reasonable wear before renewal.

The main drive is by electric motor, through spur reduction gearing to the main center roller. The back view of the straightener in Fig. 5 shows the substantial nature of this unit. The gears are enclosed by covers, which have been removed in this illustration to show the gearing. When the plate enters the cooling bank roller table, it is carried by the conveying chains to the straightening beds, if needed, and squeezed edgewise by the screw press heads against the straight edges on these tables.

Here the material separates, according to the purpose for which it is intended. Narrow plates, or skelp, intended for the manufacture of lap-welded tubes passes along the full length of the cooling bank on the entering side through the shears and pinch rolls to the piler at the end. Broad plates which require their edges sheared, are passed across the cooling bank through the end and side

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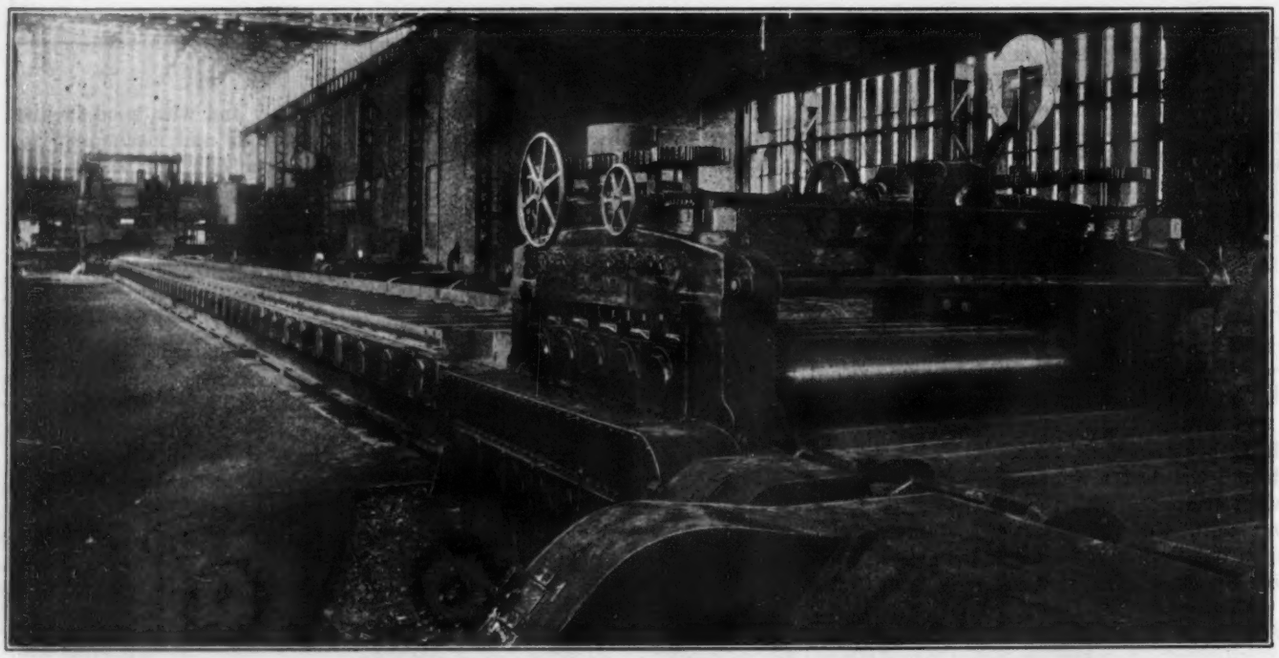


Fig. 5—Plates are straightened in a machine employing 11 *rollers which may be adjusted closely*

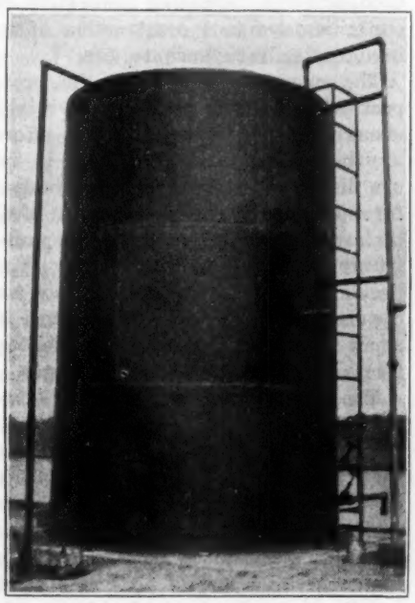
Arc Welding of Tanks Proves Economical

By Dudley W. Moore

OIL fields storage tanks, particularly the smaller sizes, always have presented a problem in the reclamation program of oil companies. Ordinarily, the rebuilding of these tanks has required, in addition to considerable labor, a good quantity of material, including new bottoms and other parts. Furthermore, it has been necessary to cut a section from the tank circumference to provide space for the new riveting, the cut material constituting a waste. The development of electric arc welding, however, has afforded a new method of repair and one that effects many economies. Old scrap material can be employed and a neat job of rebuilding or repairing can be accomplished at a comparatively low cost.

Continuous Surface Is Obtained

When it is considered that the ordinary steel tank carries several thousand rivets, each of which must be punched to fit, and that each provides a possible source of leakage as well as of deterioration, the advantages in obtaining a continuous steel surface through the use of arc welding is better understood. One of the pioneers in the development of electric welding as a means of rebuilding oil field tanks in the Prairie Pipe Line Co.



A 480-BARREL WELDED TANK. NOTE THE CLEAN CUT APPEARANCE OF WELDED SEAMS

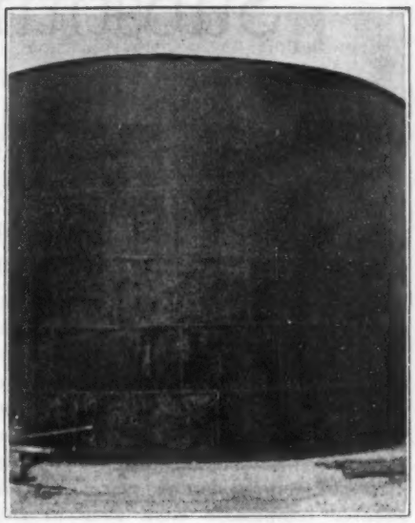
Arc welding, experience has shown, will accomplish best the purpose of rebuilding small tanks and of repairing the bottoms on large ones instead of riveting. In repairing old bottoms on containers ranging from 3000 to 35,000 barrels capacity, all seams and holes are welded up when rivets are pulled out, instead of cutting down the shell of the tank and re-riveting the old bottom or laying a new one as was practiced before arc welding.

Another method of repairing old tank bottoms, where the iron was found in good condition but where many rivets had been eaten off by corrosion, was to use the patch bolt. First the hole from which the rivet had been drawn was tapped with a 7/16-inch or ½-inch tap, depending on the rivet hole size. The threaded patch bolt, that is, a bolt with cone-shaped head provided with a center square for application of a wrench, then was screwed into the threated hole, thus drawing the two sheets together. After calking carefully, the job was complete. In cases where many rivets were eaten off, the repairing proved a slow process and did not give as strong a job as arc welding.

Welding Proves Successful

The Prairie Pipe Line Co. has welded or made repairs on several 35,000-barrel tanks, and also a number of smaller sizes. On some of its equipment the rivets and calking seams were found to have been corroded to such an extent that it was necessary to make a complete welding job of the entire bottom, welding up all seams and rivet holes. Before proceeding with this work, the steel was inspected carefully to make certain that the proposed weld job would be justified by the expense. Several successful repair jobs of this kind were thus completed toward this end, in many cases iron from the junk pile being employed. All work was tested with water pressure under the bottoms before allowing tanks to be returned to service. As a surprising outcome of this experiment, it was found that only one or two small leaks developed in all the arc welding work on tank bottoms.

Thus encouraged, 15 arc welded tanks have been completed by this company during the past year, ranging in size from 120 barrels to the 480-barrel size. These tanks were made from iron reclaimed from a 35,000-barrel tank which had been rebuilt so many times that the rivet holes were extra large. Such iron would have required re-shearing and re-punching to make it fit for further use in the construction of large storage units.



WELDING THE SEAMS WHERE THE RING CONNECTS WITH THE BOTTOM OF A 480-BARREL STEEL TANK

The reclaimed steel was first taken to the company shops, where the bottoms and shells were laid out, trimmed with an acetylene cutting torch and rolled to the proper diameter for various size tanks. As is stated above, these ranged from 120 to 480 barrels capacity. After being trimmed and rolled, each tank was shipped to its destination and there built up in the field where it was to be placed in service. This might seem like extra expense and the question might be asked why the tank could not be built at the shop and shipped arc welded. Due to the particular work for which these reservoirs were intended and great variation in settings at the different stations, the company decided that it was best to build the tanks at their respective locations.

One Tank Makes 15 More

It will be understood that all the shell from the cut-down 35,000-barrel tank was used in making the 15 smaller units. This steel ranged in thickness from 7/16-inch down to 3/16-inch, the lighter being used in building the smaller tanks.

In the actual construction work, as many sheets were laid as were re-

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Substituting Steel for Wood in Building Construction

Opportunities for Extending Use of Metal Are Abundant If Manufacturers Will Push Campaign of Education, and Adopt Means for Selling Smaller and Handier Lots—What the Obstacles Are

By Henry R. Brigham

THE housing shortage caused by the war created an unprecedented demand for new building construction with the natural accompaniment of unprecedented prices and a greater temptation than ever to cut down quality in striving to fill that demand quickly at as low costs as possible. The housing committee of the National Association of Real Estate Boards sensed the situation and at once began to strive to create conditions that would result in better building, knowing that shoddy construction is always uneconomic.

Largely for that reason it has fought rent legislation which is one of the greatest stimuli for shoddy construction, and it has advocated the elimination of unreasonable provisions in building codes which causes unnecessary costs, and has welcomed the work of the department of commerce in recommending simplified standards in building codes. It has advocated the abolition of unreasonable labor union rules and has suggested ways and means of reducing the seasonal peaks of the construction industries so that labor costs in the construction industries may be reduced without any reduction of the annual wages of labor in those industries.

It now wishes to suggest how the structural steel manufacturers of the country may assist in promoting better building and at the same time, it is hoped, reduce the costs of better building. Incidentally it is expected that the program it suggests may result in aiding the simplification and standardization of building codes and the desired reduction of the seasonal peaks in the construction industries.

Business Prospects Good

Charles M. Schwab is reported as having said recently that "the year just passed is the second largest in volume in the history of steel. The year wasn't the best in profits, but the profits are ahead of us."

On the same day Judge Gary said: "We are on the eve of great prosperity, it appears."

Saving the Forest

IT IS interesting to recall that in 1558 *Queen Elizabeth stopped the manufacturing of iron in parts of England because so much wood was being used for fuel that the forests were being depleted. Now the manufacturers of iron and steel through use of coal are in a position where by increasing their production and extending the uses of their products they can materially assist in lessening the depletion of our forests. If we lived under an autocratic government we might well be ordered to substitute the use of steel for lumber wherever possible in order to save our forests.*

Under such circumstances, with the steel business increasing nearly to capacity, one might think that it would hardly be worth while to attempt to interest steel manufacturers in new fields for their business which might require large outlays of time, thought, and money to make them fertile and profitable. It is a poor business man, however, who does not in times of prosperity prepare for times of depression. For those now on the wave of prosperity it is far easier financially to spend time and money in research work designed to increase and improve their business than it will be when the tide turns and business is poor, and those who have successfully carried on such research or development work will not be carried out so far to sea on the wave of adversity as those who wait for that wave to come before preparing for it.

The steel industry is one of the greatest industries of modern times and its history is an exceedingly interesting one showing a progressive advance due to the inventive genius, imagination, courage, and hard work of many of the men who have engaged in it. By great inventions production has been steadily increased and costs have been lowered, which have naturally stimulated greater use of steel products. The great modern sky scrapers, tremendous bridges, large fast steamships, and extensive manufacturing plants built rapidly and of great strength by use of steel are modern monuments to the growth of the steel industry and American imagination and scientific ability combined with foresight and daring of men of finance. Steel alone has made many of them possible.

Opportunities For Steel

Steel, however, is not playing the part that it could or should in the construction of residences, apartment houses, garages, and farm buildings. As this country grows the decrease in timber reserves will make it increasingly more difficult and expensive to use lumber in such construction to the extent that it is now used, and the increasing congestion of our cities demands construction offering greater resistance to fire.

The question is whether the prospect of increased business is bright enough to be worthy of the effort at the present time. There is no use discussing large apartment houses for the value of use of structural steel in large buildings has been adequately proved and is being adopted. The problem is whether there is not an opportunity for greater use of steel in small apartment houses, residences, farm buildings, and small garages.

The total value of building construction this year will be over $5,000,000,000 and it has been estimated that it may be about $6,500,000,000 of which about 44 per cent will be in residential construction. It is safe to say that steel was a negligible factor in the greater part of that residential construction whereas it doubless could have been substituted to advantage for lumber in the framework and as floor

Abstract of paper presented at annual convention of American Institute of Steel Construction, White Sulphur Springs, W. Va., Nov. 13. The author is chairman of the housing committee, National Association of Real Estate boards, Boston.

joists. Making a conservative estimate there was probably $200,000,000 spent for lumber that might have been spent for steel.

Reducing Fire Hazards

If while business is good and opportunities are large the structural steel business can be developed so that steel will be demanded in place of lumber in residential and farm construction, then when construction declines the steel industries will have created an additional market for their products, which it will be much more difficult to create if they wait until such decline in construction. Furthermore they will perform an inestimable service to the country.

The annual fire losses of this country are over $535,000,000 a year, and the last report shows in one year 162,427 frame houses, 37,531 brick houses, 282 fireproof, destroyed by fire.

Steel frames and floor joists alone will not help much in preventing fires but if costs can be made low enough steel can be combined with concrete, gypsum, asbestos or other mineral compositions, making fireproof buildings and at the same time protecting the steel from corrosion.

Our annual building losses are swelled by destruction by earthquakes and tornadoes and whereas in past years many of us have thought our particular parts of the world immune we have now been duly warned by actual demonstrations that we are not. Buildings constructed of steel frame in earthquake zones have demonstrated greater resistance and security than any other type of construction.

The great demand for new construction has recently caused an increase of production of lumber, after several years of decreasing production, and the sad fact is that for many years we have been depleting our forests. In 1922 the department of agriculture reported our annual drain on forests to be 25,000,000,000 cubic feet whereas our annual growth was 6,000,000,000 cubic feet. Our annual drain is now over 30,000,000,000 feet and it is doubtful if our annual growth has made any substantial increase. The result naturally is that lumber prices are rising and that if the manufacturers of structural steel wait long enough the public will be forced by the scarcity of lumber to use their products more, but they will be performing a public service if they help to prevent the terrible depletion of our forests before they are depleted to that extent.

The other factor in favor of structural steel as compared to lumber is that it is something that is scientifically made and it is possible for the manufacturers to establish and to maintain the right standards of quality in manufacture and largely to control its use in building construction. When lumber is ordered for a house it is usually cut to fit on the job which means waste and which also gives the builder an opportunity to fail or neglect to use as much as he should. There are also many grades of lumber, and standards of quality for certain uses cannot be as scientifically and accurately maintained.

The lumber may all be suitable for some purposes, those uses varying with quality, but the lumbermen cannot control the use after sale, while the structural steel manufacturers through such organizations as the American Institute of Steel Construction can determine quality and maintain standards and sell only certain quality for certain uses. By maintaining quality and standards you can see that building codes are drafted to require minimum quantities of material whereas if qualities should vary the building authorities would doubtless feel obliged to guard against use of inferior qualities by requiring more quantities than would be necessary if only first class quality should be used. Thus again advantage would be gained over lumber where specifications must be based on the average good quality rather than the best. The steel men also can go further and see in furnishing structural steel for building purposes that the building is being properly built so far as the steel is concerned. It is unlikely that where steel is cut perfectly to measure according to approved plans that there will be any change on the job although, of course, there is always the chance of poor workmanship due to ignorance or carelessness in contradistinction to intentionally poor work and false economies.

Until corrosion has been better conquered, wood will be preferred to steel for many uses where steel might be preferable except for that objection.

Cost Factor Considered

The other objection to the greater use of structural steel in residences, garages, and farm buildings is the cost, but it is suggested that that is not a logical objection but one based on wrong premises and one that could be wiped out by a campaign of education and practical demonstrations.

Even if a steel joist a certain length costs more delivered than a wooden joist of the same length suitable for the same use it does not necessarily mean that the final cost of erection of the building is going to be more. The greater strength and rigidity that can be obtained in the steel joist makes it possible to reduce the number of joists and to lessen the necessary number of supports. This may result not only in the use of less feet of joists but in simplifying the entire structure so that a considerable excess of cost per running foot of steel over lumber might not result in any greater final cost for the material for a building. Then further it is possible, if the structural steel is cut to measure and delivered ready to be bolted or riveted in place, that with proper appliances for its erection, time can be saved as it is saved in the erection of skyscrapers, and labor costs can be reduced. When lumber is delivered on a job it is generally not cut to measure but has to be cut on the job which means additional labor costs.

Meanwhile the substitution of structural steel for lumber means a campaign of pioneer work, of education, and of advertising. The forming and subsidizing of a large company of men skilled in house building to build such houses through the experimental and development stage might be worthy of consideration. Then when best standards of quality and sizes and easiest and cheapest methods of construction have been devised, would come the general education of architects, builders, and engineers and by advertising the creation of a demand for such construction.

There is no reason why steel manufacturers should let cement manufacturers get ahead of them in residential construction. On the contrary best

Simplify To Sell

RESIDENTIAL construction offers a large and almost untouched field for expansion of the steel industry, and the industry has much to offer in greater permanence, strength, and reduced fire hazard. The customs of centuries, however, are not overcome without effort, and costs are an important vital factor in residential construction.

It is up to the steel industry to assume the initiative in developing such greater use of their product and to arrange for the fabrication of steel for such purposes in designs that can be more easily and quickly handled and erected than wooden beams and girders and at less cost, and to arrange for its distribution in smaller unit shipments.

results can probably be obtained if they work together. If the frame works are steel protected from the weather by concrete, then with metal lathing the strongest of concrete walls and floors can be made with a concrete gun, the steel framework reducing the quantity of concrete necessary and furnishing a strong frame which will serve as a great protection in case of any defect in the concrete work or damage by earthquakes. Not only would the consumption of steel be materially increased permitting a greater tonnage output, but the public would derive the benefits of greater security.

Gives Technical Aid to Refractories Users

Contact between producers and users of refractories has just been established as the latest activity of the Mellon institute, Pittsburgh, and in the first few weeks of operation already has proved its usefulness in a broad field. The work is under the direction of M. C. Booze, holder of the refractories fellowship at the institute, who is acting under the general auspices of the American Refractories institute, organized early in 1925, when it took over some of the activities of the Refractories' Manufacturers' association, among them the Mellon fellowship. The work is conducted through a service bureau operating through the columns of trade periodicals reaching iron and steel industrial executives. The service is designed to assist users of refractories in solving technical problems. As progress of the work justifies, the service will be extended to comprise other industries, the final result desired being that the Mellon institute be the accepted liason agent between manufacturers of industrial products and their users.

Readers of technical journals are invited to submit their problems and questions on refractories to the publications which will refer them to Mr. Booze, or to submit the inquiries direct. It is not planned to undertake any laboratory work, except in rare cases, to reply to communications. The resources of the fellowship are equipped to handle the service. It has been engaged in research and testing work on refractories for eight years and has made a vast accumulation of information on all angles of the subject. The fellowship enjoys a wide acquaintance among manufacturers of fire brick and with investigators on refractories and these can be consulted at will.

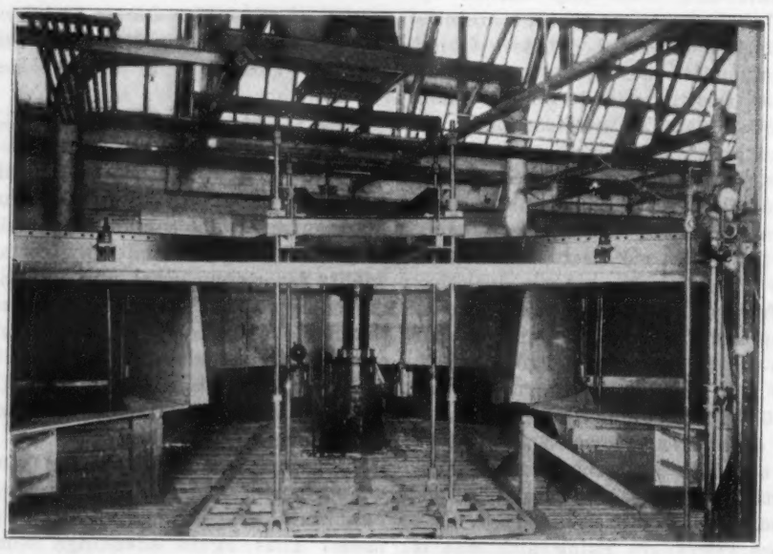
Installs Apparatus To Remove Pickling Acid Fumes

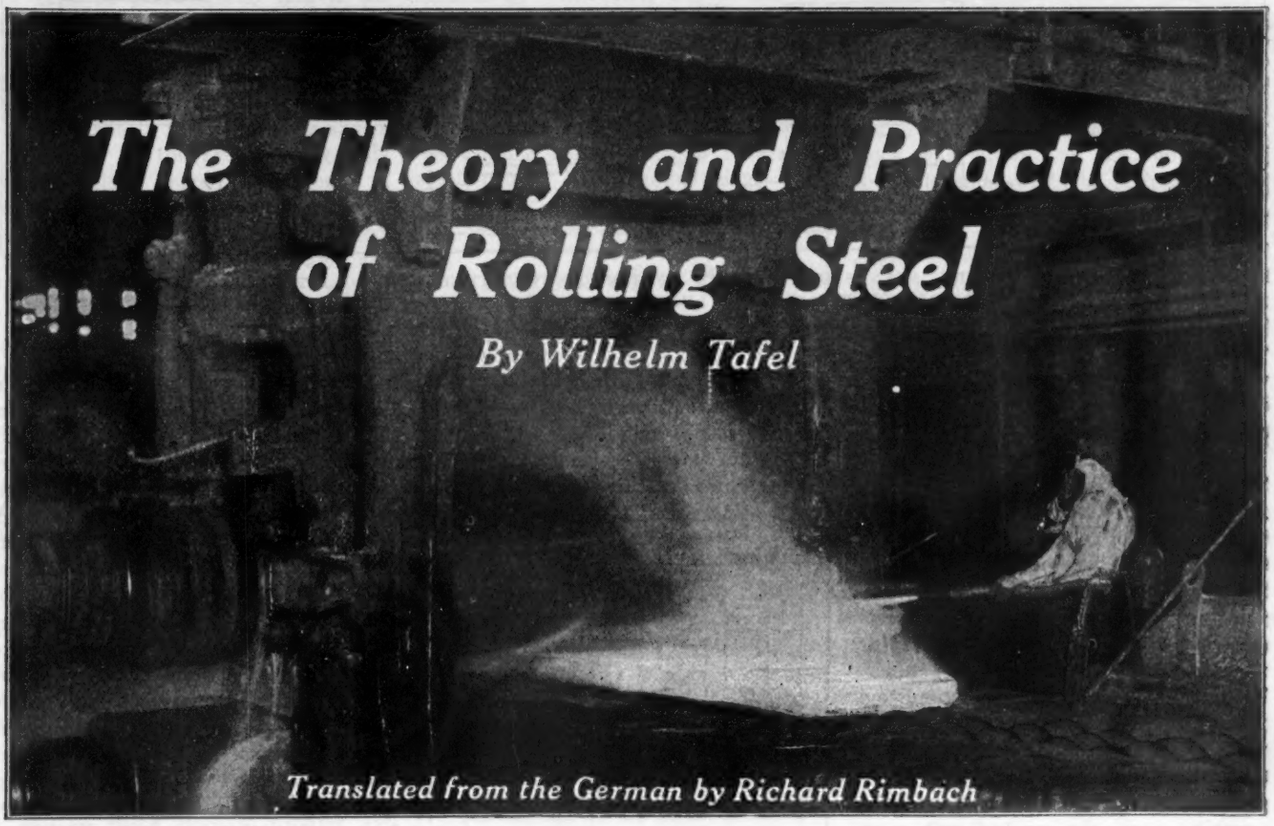
REMOVAL of acid fumes from plating and pickling rooms presents a serious problem but the solution is imperative if a high rate of production is to be maintained. A large manufacturer of motor trucks in Cleveland had this problem to contend with and solved it by the installation of a fume removal equipment which is believed to be the first of its kind ever built. The Northern Blower Co., Cleveland, designed and installed the apparatus.

The pickling machine was built by the Mesta Machine Co., Pittsburgh, and consists of five arms equidistantly spaced and suspended from a frame which can be rotated. Each arm carries a heavy acid-proof tray having a loading capacity of 6 tons and being suspended by rods so as to be raised and lowered automatically with the rest of the arms by means of a steam cylinder. The accompanying illustration gives a good idea of the construction of the machine, the steam cylinder being shown below the center of the rotating frame. In operation the machine carries the trays successively from the loading position in the foreground to the various tanks.

To provide complete acid resistance, all parts of the fume removal equipment were made of special alloy. The tank tops are completely enclosed in a semicircular nickel alloy sheet hood reinforced with nickel alloy shapes. The ends are left open as air inlets to remove the fumes from the pickling room. When the loaded trays are immersed in the tanks, the semicircular hood fits down over the tank tops, thus collecting and removing the fumes. When the arms are raised, however, the collars on the suspension rods engage with the hood and raise it just sufficiently to permit it to revolve with the arms to the next position where it is again lowered. A close fitting deep channel section flange which runs all around the top of the hood effectively prevents escape of fumes during the turning movement.

The piping and fan are of the usual type but are made from acid resisting material, of course. The fan case and piping are of nickel alloy throughout and any tendency for spray or condensed acid to collect at the bottom of the case is avoided by providing a lead drainage pipe at this point, thus returning the liquid to the tanks. Since the nickel alloy is not suitable for the fan shaft, acid-proof bronze was used for this purpose.





The Theory and Practice of Rolling Steel

By Wilhelm Tafel

Translated from the German by Richard Rimbach

Chapter III

ROLL pass design invites close study. If the pass is overfilled, the steel squeezes out at the open places causing the formation of fins; if the pass is underfilled stock of uneven thickness is produced. Frequently the pass is filled but the material is rendered rough or develops stresses which are not relieved. Defective stock may be produced if it is not gripped by the rolls or if it attempts to push beyond or knock out the stripper guides and wrap around the roll forming a collar. If the stock does not leave the roll perpendicular to the plane of the rolls, but at an angle to the side, or it becomes twisted about the axis, the product will be defective.

The pass, if overfilled, can be made broader or the previous one narrower to allow more spread. Another means of correcting overfilling is to round or bevel off that part of the roll which cause the fin formation. This is an important means for correcting new passes, without excessive machining. To take out the fillets or bevels e of a pass in Fig. 57 can be done on a lathe, without making any changes on the other roll. On the contrary, an increase or decrease of the pass width can only be made to a limited extent and then only by turning down the entire roll. If the lower roll is turned as shown by the dotted line in Fig. 57, a gaping hole at o, results because the part of the upper roll fitting into this is too narrow. To compensate for this opening the roll must be turned down so that, due to the conicity, the desired width b_2 also is restored in the upper roll. Since the overdraft cannot be changed the lower roll must be turned down the same amount.

With new difficult passes, the draft and spread are chosen purposely so that without fillets in the roughing pass, the particular shape will presumably be too full. Then a fillet or bevel, which is so large that the shape

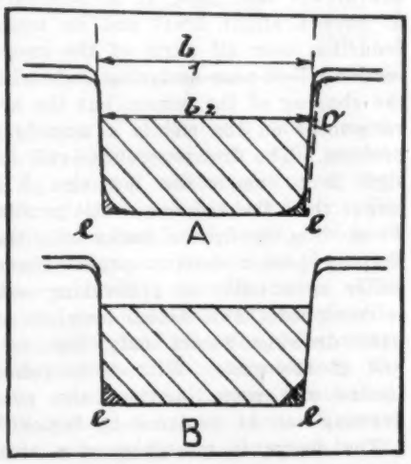


FIG. 57—EFFECT OF FILLETS AND BEVELS IN CORRECTING NEW PASSES

will apparently be somewhat too empty, is chosen. After putting in the rolls for testing an exact filling can be determined by taking off as much of the fillet of the roughing pass as there is steel missing. In addition the fillet centralizes the stock in entering it into the rolls. Where the stock is spread, the profile will be too full on one side and too empty on the other, which cannot be avoided by changes in the width. This is due either to the roll axes not being exactly parallel, or to the diameters at different points in the pass not being equal mathematically. For this reason the rolls work on the stock, not only in the sense of drawing it in, but in pressing it against one side of the pass.

Finally the formation of the fin can be avoided in that more draft is given in the center of the pass, whereas, the outer parts shrink and lose the tendency to go beyond the pass boundaries. The underfilling may be due to the pass as a whole having too little draft or to the distribution of the draft being uneven. In the latter case unequal elongation usually occurs in the individual parts of the cross-section and results in shrinkage. Finally the pass cannot fill, because the working diameters are uneven and therefore the velocities with

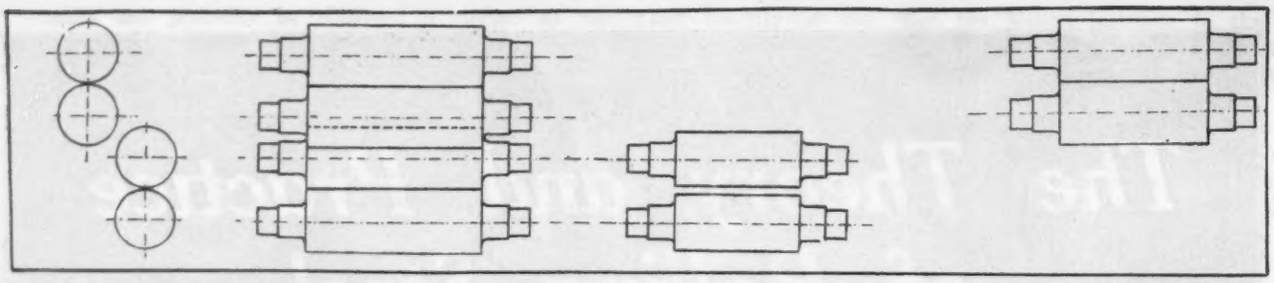


FIG. 58—BY PLACING TWO 2-HIGH STANDS IN THE SAME HOUSING SO THAT THEIR TWO ROLL PLANES ARE IN FRONT OF ONE ANOTHER AND THE BOTTOM ROLL OF THE ONE SET LIES HIGHER THAN THE TOP ROLL OF THE SECOND, THE DOUBLE 2-HIGH EFFECT IS OBTAINED

which the individual parts of the cross-section would leave the rolls, if they were not connected.

The means for preventing the rolls from not gripping are lessening the draft, ragging the rolls and eventully increasing the roll diameter. If the stock does not free itself easily from the rolls, it is due either to a strong pressure against the pass walls necessitating an increased pass spread; or the pass does not have enough taper. Leaving the rolls in a bent condition is due to unequal draft or unequal temperature of the different parts of the cross-section. If the former cannot be corrected by changing the roughing pass, the crooked exit must be considered.

Turning in the pass occurs mostly with rounds. With hollow sections the turning can be opposed by a strong guide pressure on the edges. A strong tendency to turn sometimes originates from the roll axes not being parallel due to faulty machining or unequally worn bearings. If the center of the necks on both sides of the roll are not in the depression, the bearings should be changed.

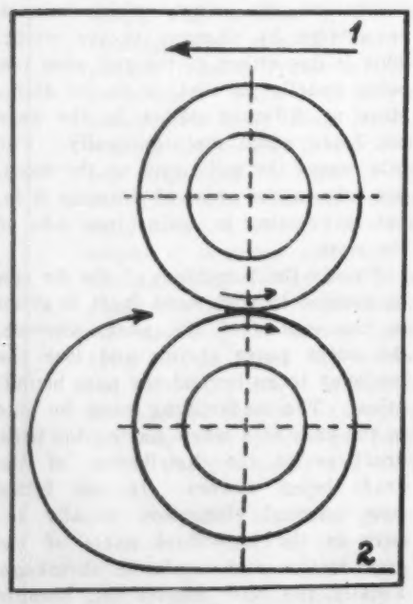


FIG. 59—ARRANGEMENT OF ROLLS IN A TWO-HIGH MILL

Uniform finished product is due to the draft in the last pass being too large. The dimensions will be ununiform, if in the later passes the individual parts of the cross-section have different draft. The amount of shrinkage depends on the plasticity and on the resistance to travel. Hot steel has a low resistance to travel. As water is used on the rolls for cooling purposes a steam layer is formed between the rolls and the stock which reduces the friction between the section and the roll. Both the plasticity and the travel resistance are sensitive to slight temperature changes at various points of the material to be rolled.

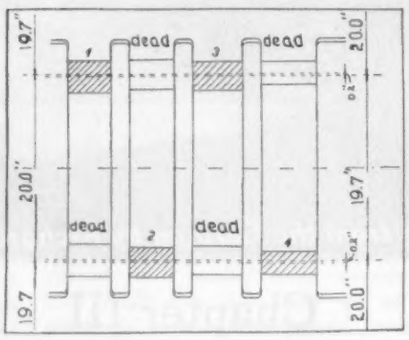


FIG. 60—METHOD OF CHANGING OVER AND UNDERDRAFT FROM PASS TO PASS

To receive an accurate finished product in the last pass, it is necessary to have a slight draft and an equal reduction over all parts of the cross-section. Roll pass designing ends with the shaping of the passes, but the arrangement on the roll is a secondary problem. The first procedure—roll design is to make the hot size 0.13 larger than the finished or hot profile. From this is drawn backwards the shaping passes until a profile found either on a billet or a blooming mill is developed. This actual template or pass drawing shows only the outline of the pass. With rectangular, square and round sections the pass drawing can be replaced by tables.

The design is scratched on a steel or zinc sheet with a steel scriber. The sheet 0.04 inch thick then is trimmed along the lines and cut out slightly oversize. The excess material then is filed off, so that the template matches the pass drawing: where possible the checking should be done with the caliper square. With difficult designs a difference of 0.004 inch may cause trouble. All fillets should be exact. The templates are used by the roll turner and by the superintendent as a means of control. For this purpose the two mated rolls are set up in the lathe above one another and are pushed together according to the cut-in passes, until the collars are a distance apart equal to the spring. The space remaining empty must then be exactly filled by the template, if the rolls have been turned properly.

Before making the lathe tools the templates with the roll drawing are returned to the office of the roll designer, who satisfies himself as to their checking. They are filed for use in case it is desired to restore the original shape. The templates serve to finish the roll drawing, in that the roll lines first are drawn and the passes with their neutral lines to coincide. Then the collars are drawn

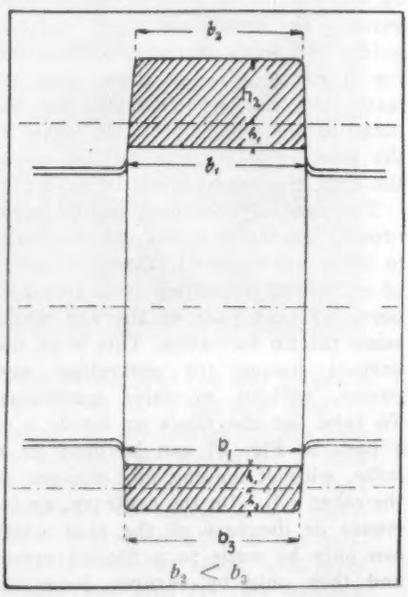


FIG. 61—DIFFERENT PASS DEPTHS ARE REQUIRED FOR DIFFERENT WIDTHS

free hand in preliminarily and if the layout appears satisfactory the templates are traced in with pencil or pen, and the collars drawn in final. Widths and diameters are put in. The drawing made in this manner is shown in Fig. 38. In the roll drawing only the dimensions should be given. If tests show that changes in the rolls are necessary, they should be made from the pass drawing, templates and roll drawing. The practice of the roll superintendent or the roll turner changing the template or the roll directly, is objectionable.

Roll design with prospective trains proceeds somewhat differently than with existing trains. In this case, the rolling program first is authorized and an estimated layout of the number of passes and pass widths is made according to the example presented in the accompanying table. A diameter of 25.591 inches and a body length of from 74.803 to 78.740 inches is chosen to provide a full set of square and two sets of flat passes on each roll. If the smaller body length is chosen, the square set will have to be arranged somewhat differently to save this 3.937 inches. The last passes of two or three channel profiles are placed on a finishing roll, and the first on a roughing roll, since the nine passes would be too much for one roll, and not enough for two.

As the last work for roll pass designs, for which new guides are the final procedure of roll pass design is to prepare drawings of guides. The necessary stripper guards are finished at the same time. The exact fitting to the rolls by machining and filing, is accomplished after the rolls are finished. Test pieces are put through the consecutive passes after the rolls are set so that the thickness of the profile corresponds exactly to the templates or pass drawing, which the roll designer takes for the test. From each pass a piece is cut off and after cooling, sawed or milled so that the profile can be inspected. If the design is correct, the template will cover the profile. If the passes do not fill or if they run light changes must be made in the rolls.

Rolls of pure gray iron, poured in sand, seldom are used for finishing because they are too soft and spall off at the collars too easily. For rods and shapes, the so-called half-hard roll is the best. It contains according to the desired depth of hardness a greater or lesser addition of white iron which is poured into iron molds coated with loam. It receives a slight quenching which renders the surface more or less hard, according to the amount of white iron added and the thinness of the loam wash.

Chilled or polishing rolls are necessary, when the stock should have a flat and bright surface, or where the wear of the groove should be small. The chilled rolls for hoop and sheet steel usually are ground dry.

Layout of a Pass

Item	
A. Largest shape: channel	5.512″
B. Largest flat or hoop	5.906″
Smallest thickness	0.197″
Smallest width	2.362″
C. Largest square	3.543″
Smallest square	1.575″
Number of passes in item A	9
Average width	5.315″
Inner collar	5.906″
Outer collar	7.874″
Number of passes in item B	6
Average width, largest profile	5.709″
Average width, smallest profile	2.165″
Inner collar	1.969″
Outer collar	2.362″
Number of passes in item C	17
Average size of pass	2.559″
Diagonal of this	3.622″
Inner collar	0.787″
Outer collar	2.362″

TO DETERMINE BODY LENGTH AND DIAMETER

Roll diameter:

For largest height of the 5.512″ channel pass the height, h, equals or approaches 2.362″.

The diagonal of the 3.543″ square is 5.118″.

The height, h, equals 2.559″. For rod rolls the diameter is estimated at $10 \times h$ or 25.591″.

Body length:

For channel—

9 passes of 5.315″, av. width	47.835″
8 inner collars 5.906″ av. width	47.248″
2 outer collars 7.874″ av. width	15.748″
	110.831″

This length is too long. The body length for shapes should not exceed $3 \times D$, in this case not more than 82.677″.

For flats and hoops—

If a large and small profile are placed on each roll the average width is 5.709″ + 2.165″ ÷ 2 or 3.937″, and

12 passes at 3.937″	47.244″
11 inner collars at 1.969″	21.659″
2 outer collars at 2.362″	4.724″
	73.627″

For squares—

17 passes at 3.622″, av. width	61.574″
16 inner collars at 0.787″	12.592″
2 outer collars at 2.362″	4.724″
	78.890″

In case of necessity a useful method for highly stressed small profiles is to pour a chilled roll and then turn off the outer hardest layer. Beneath is a semihard layer, which in pouring was compressed by the outer layer and made entirely dense. This makes excellent, but expensive rolls. For cogging and blooming mills, where a flat surface is not necessary the rolls usually are of forged cast-steel. With rolls that are too hard the passes wear out rapidly by burning; in addition they show a tendency toward fire cracks because of the uneven heating of the individual places, which due to the low plasticity of hardened material find little opportunity for relief.

About 50 years ago old mills were equipped with two-high rolls. The stock was entered on the one side of the rolls and had to be returned from the rear to the front side of the mill after the passage. This was done either by pulling it over the upper roll as shown by direction 1 in Fig. 59; or it was passed beneath the lower roll, bent upward with the tongs and again entered between the two rolls as shown by direction 2. To give the stock an edging pass in the first method, requires a knack on the part of the crew especially with long bars. With the second method as shown in Fig. 59, the side, which previously was up, is down after the bending during the second pass. The bending, however, is only possible with thin stock. Ordinarily the two-high in this form is no longer used.

To obtain a larger output a third roll was installed. The stock is entered as shown in Fig. 63, for example, between the lower and the middle roll, and is returned to the same side between the upper and the middle roll. By this arrangement in comparison with the ordinary two-high mill the output is doubled in less time.

The advantage of the three-high mill, namely that the return takes place with the same expenditure of roll work, is possible with the two-high mill, if two sets of rolls are arranged side by side or in front and above one another. The first arrangement is called alternating two-high and finds use in all cases, in which the stock is thin and does not drag on the floor for any great distance between passes. In the three-high mill the ends of the stock only touch the floor every second pass, as they are caught by the roller with tongs and immediately entered again. Meanwhile the stock lies on the floor between each pass, and does not cool uniformly. The alternating two-high mill is desired, where long rods are rolled, as with wire, small hoope steel, etc. The set-up as shown in Fig. 62 is somewhat as follows, that is, in one stand of a three-high housing a roll is placed at the bottom and in the middle, and a so-called driving spindle is mounted above. In the adjacent stand a roll is placed above and in the middle. The former top roll of the second stand is coupled with the driving spindle of the first stand. At the bottom of the second stand the spindle, in place of the roll, transmits the

power to the lower roll of the next stand.

If instead of placing the two two-high stands adjacent they are placed in the same housing in such a way, that their two roll planes are in front of one another and the bottom roll of the one set lies somewhat higher than the top roll of the second as shown in Fig. 58, the so-called double two-high effect is obtained. The driving spindles are unnecessary in this case, because in the one roll plane the adjustment is made only from above, and in the other from below. On the contrary this makes for a complicated transmission, because of the two pairs of gears and the connection between the two with a fifth gear. This type is known as Dowlar's mill.

The two-high mill still is used to advantage today, namely in the reversing mill, that is, a pair of rolls which can be run in one direction and then the other by reversing the driving medium. The advantage of this type is, that during the rolling pauses the train stands still. In addition the stock always remains in the same horizontal plane and need not be lifted or lowered by tilting tables or similar devices, as is the case with the three-high mill. Installation costs for the mill and housings also are lower. The principal advantage is, that due to dispensing with the fly wheel, which cannot be used in a reversing mill because the reversing could then only take place after considerable retarding work, the number of revolutions can be varied to suit conditions.

Disadvantages of the reversing mill include the accelerating work which is used, the impact which occurs in reversing due to the play in the couplings in the mill and the driving motor. An additional disadvantage is, that the material which due

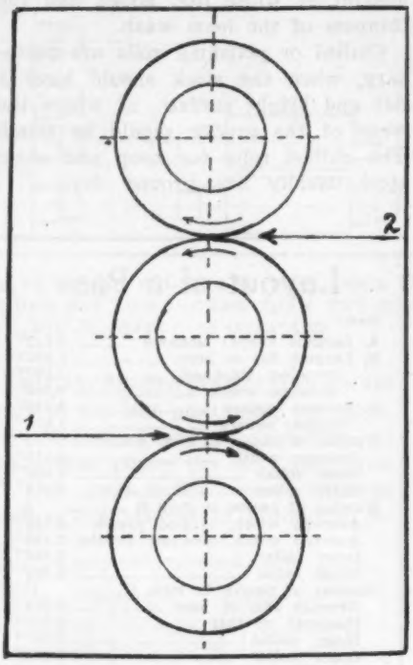


FIG. 63—ARRANGEMENT OF ROLLS IN A THREE-HIGH MILL

to the bevel requires turning through 180 degrees after every pass, unless in the first pass the lower roll is given the positive and the upper the negative collars are vice versa in the next pass as shown in Fig. 65. The arrangement of the roll collars avoids turning, but requires much room on the roll.

The reversing engine must develop the maximum amount of rolling energy because the fly wheel is dispensed with. It frequently is of larger dimension than a machine with which the peak loads are absorbed by the fly wheel and therefore costs more. With electric power, transformers must be added, which makes the cost of reversible motors much higher than ordinary motors. The steam engine, if it is reversible, has a higher steam consumption per horsepower hour than one equipped with a fly wheel. With the three-high mill without turning the stock a change of sides takes place, on which the bevel, that is the opening of the pass, lies. This omission of the turning is the principal reason why three-high mills work so rapidly.

An advantage, which the reversing mill and the double two-high, but not the alternating two-high and the simple two-high share with the three-high is the change of the rolling direction. With alternating and simple two-high mills the same end of the stock always is served to the rolls first, while with the three-high unit the ends alternate. With cross-sections having equal draft in all parts a certain flowing apparently takes place between the inner and outer parts. This relieves the stress in part, due to the different elongations; although as much stress remains as is necessary to induce flowing. The residual stress is removed by every second pass if the rolling direction changes, while it increases with every pass, if this is not the case.

The disadvantages of the three-high mills are:

1. The mechanical adjustment is more difficult than with the two-high.
2. The set up of the rolls and the regulation of the guides requires twice the time than with a two-high mill of the same diameter.
3. In the side adjustment, the rolls of the three-high mill are dependent on one another. If the middle roll is moved in relation to the top, to make corrections, the bottom roll no longer will match the former but also must be corrected.
4. With the three-high mill either above or below every used pass there is a so-called blind opening. Or with a pass which lies immediately below or above the blind pass the layout is bound to the width of the latter. Therefore, the spread is limited. This results from the taper if the pre-

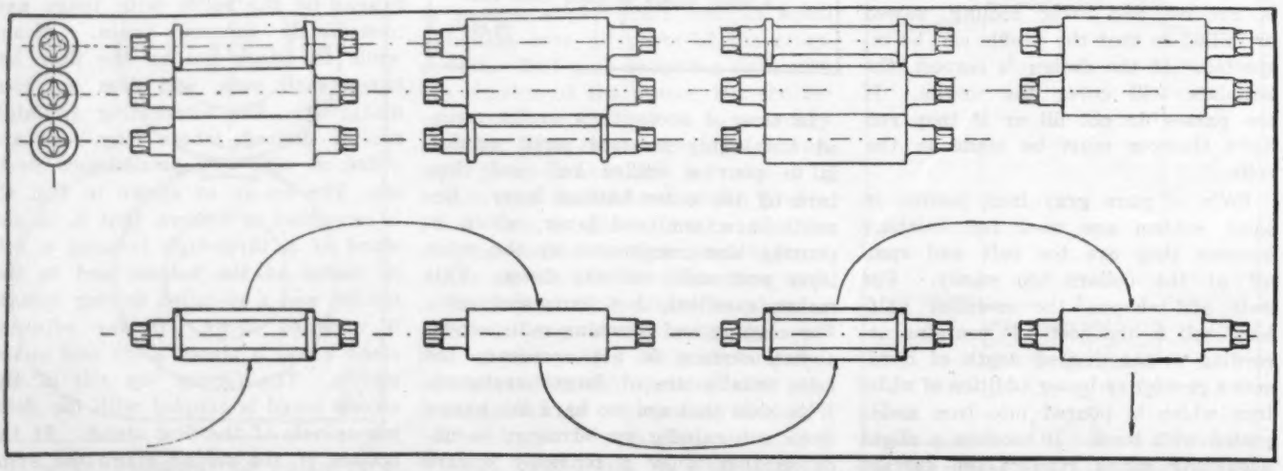


FIG. 62—ARRANGEMENT OF ROLLS IN AN ALTERNATING 2-HIGH MILL. THE FINISHING ROLLS ON SUCH TRAINS USUALLY ARE ADJUSTED FROM ABOVE. IF THE TRAIN IS LARGE THE ADJUSTMENT IS MADE FROM BELOW

vious pass is cut considerably deeper into the roll as shown in Fig. 61.

5. The sources of error, that is the spring in the bearings in the vertical as well as in the lateral direction and other differences, are larger with the three-high than in the two-high mill. The rolling will be less accurate than with the two-high unit.

6. As previously mentioned, it is desirable to make the lower roll grooved and to provide the upper roll with overdraft. This is impossible with the three-high mill. If this condition is fulfilled between the middle and the upper roll, it cannot be fulfilled between the middle and the lower roll.

The errors under items 3 to 6 are avoided with the double two-high. The disadvantages of this construction are that long stripper guards are necessary with the lower set of rolls, because they must be carried under the upper set; and, that the driving in the two roll planes gives a complicated arrangement of the drive pinions, which is bound up with the higher use of power. Finally the lower and upper planes, in which the bending is done, lie further apart than with the three-high. It is therefore not to be advised for roll diameters, over 15.748 inches. A good solution is to combine the three-high and the two-high in a way, that the finished pass and the last shaping pass will be on one or two two-high mills, the rest of the roughing passes on one or more three-high mills. The finishing rolls on small trains, of about 21.654-inch diameter are mostly adjusted above as shown in Fig. 62. With large trains, the adjustment is made from below, so that the last pass will leave in the height of the cooling beds.

This arrangement is adapted to the rolling of flats with the roughing passes on a three-high and an ending and polishing pass each on one two-high mill, as well as to the rolling of guide rounds with the roughing passes on a three-high mill and an oval and finishing pass each on one two-high mill. It also is adapted to the rolling of other profiles such as large squares, roughing on the three-high, with one finishing pass on the two-high; for angles or tees, which should have exact thicknesses in the legs; and, for rods 15.748 inches diameter or less. With this arrangement the advantages of the three-high and two-high mills are combined using the roughing passes with which 0.004 inch makes no difference with the speed and change of rolling direction, while the finishing pass offers exactness, which only the two-high permits.

The three-high is made by placing a third roll either above or below the ordinary two-high, whose lower roll is

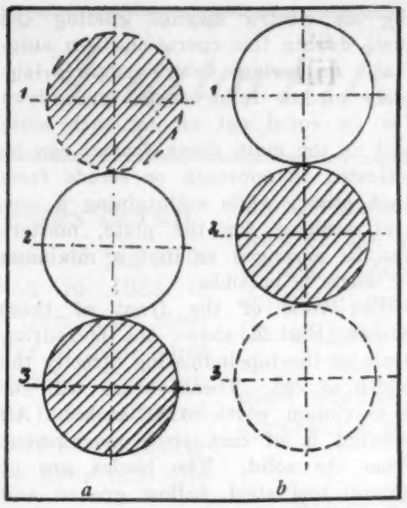


FIG. 64—DIFFERENT METHODS OF ORIGINATION FOR A THREE-HIGH MILL

grooved and the upper roll tongued. In the first case the grooved roll is above and below, in the second in the as shown in Fig. 64 *a* and *b*. In Fig. 64 the added roll is of larger diameter and in *b* of smaller diameter than the middle roll, with overdraft above (between 1 and 2) and below (between 2 and 3) as desirable. But the condition, that the overdraft be with the tongued roll, which was determined previously, so that the sticking and the overdraft both act in the same direction, is only satisfied between 2 and 3 with *a* and between 1 and 2 with b.

In addition these arrangements have the disadvantage, that the upper and lower roll are not equal, therefore cannot be interchanged. This is necessary though, where dead holes exist and where use is to be made of them. If we interchange the top and the bottom roll, without further consideration the used passes become dead holes and vice versa. In the foregoing illustrations if the top and bottom roll are of the same diameter to make them interchangeable, underdraft exists in Fig. *a* between 1 and 2, in Fig. *b* between 2 and 3. In this case the stock must be prevented from climbing by a hanging stripper guard which is pressed against the upper roll by a counterweight or a spiral spring and must also be placed where there is underdraft, and where the grooved roll lies above, that is in case *a* at 1, in case *b* at 2. Such hanging guides are undesirable because they hinder the oversight and accessibility to the rolls and cause disturbances, if the piece should go through the guides sidewise.

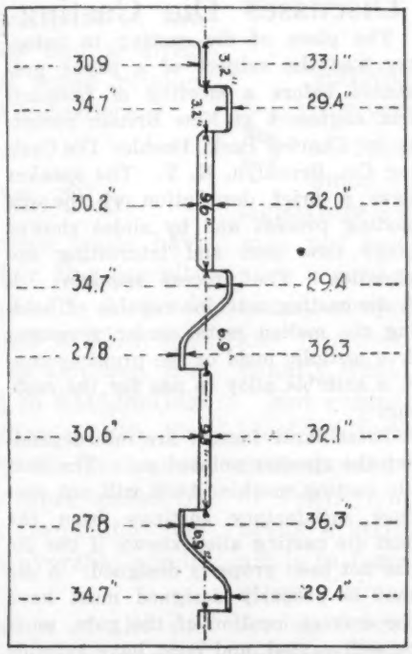


FIG. 65—ARRANGEMENT OF POSITIVE AND NEGATIVE ROLL COLLARS

A third possibility of interchanging the upper and lower roll exists. The rolls are given two diameters. In fact the upper roll in comparison with the middle is given a larger diameter, where the stock is entered above, and a smaller where it is entered below. Overdraft exists in the used passes between top and middle roll as well as between the middle and the bottom rolls, and still the top and bottom rolls can be interchanged. The latter will only wear half as fast, as the middle roll, with which all passes are being used continuously. An allowance for this is had by finishing 2 middle rolls and setting the second in as soon as the top and bottom rolls are interchanged.

Usually only grooved rolls are considered undesirable to set the passes so far apart. The overdraft in the rolls can be changed in any pass as desired. For this purpose as shown in Fig. 60, two average roll diameters are assumed, one so that the top roll is larger than the middle, and one so that the opposite is true. In the first roll line the middle lines of those passes which are to be entered above are placed and in the latter those which are to be entered below. If the middle roll is taken as the tongued and is given large overdraft, the hanging guides can be omitted. The method of two average diameters can be considered as the best for three-high construction.

R. S. Hill, Milwaukee, for several years a broker in reinforcing bars and other steel products has filed a voluntary petition in bankruptcy, listing his assets at $5879 and admitting liabilities of $18,256. Creditors will meet Dec. 24.

Completes Large British Plate Mill

(*Concluded from Page* 1646)

shears, and are thrown off the final roller table.

Dealing now with these machines in detail, straightening blocks, 22 in number, are situated on the entry side of the larger of the two cooling banks. A machined renewable straight edge is fixed to each machine, forming a sufficiently continuous line for the longest piece likely to be rolled. The machines are divided into two groups of 11, driven from opposite ends, and movement is given to the press heads by a horizontal shaft running the full length of each group, driving through machine-cut right angle spiral gears to the press screws. Press screws and nuts are protected from scale, and the spiral gears are totally enclosed and dipped into oil.

Handling of material on the cooling bed is done by unusually heavy plate link chains, running in grooves in cast steel lifting beams, which lie normally below the level of the rollers and rest bars. The lifting of these beams causes the moving chains to lift the material and carry it with them until the beams are again lowered. It will be noted that the material does not slide or rub on anything, and no marking or scoring of hot plates is possible.

The full arrangement of these chains and lifting beams may be seen in Fig. 4, the articulated beams running directly across the cooling bank from roller table to roller table. As is to be noted from Fig. 2, the driving gears and lifting arrangements are seen to be disposed neatly at each end of the two cooling banks, in a position at once accessible and safe.

A short roller table leads from the end of the entry side of the cooling bank to the shears, of a capacity to cut plates 66 inches wide and 1 inch thick, which cut the material into required lengths. No side shears are necessary, as the material handled by the machines has sharp, square, rolled edges, as finished by the universal mill.

The pinch rolls are for the purpose of feeding the material to the piling table, which stacks it ready for lifting away by the overhead cranes, in neat bundles with the ends level. A stop on the piling table ensures regular piling. This material now is ready for further processes of tube making. When the broad plates leave the cooling bank, a duplex rotary shear trims both edges of the plate simultaneously, a trolley carrying an electro magnet guiding the plate during this operation. An automatic centering device squares the plate on the roller table, and allows for an equal cut off on each side; and as the main shear frames can be adjusted to approach or recede from each other; while maintaining a central position for the plate, matters can be arranged so that a minimum of waste is possible.

The view of the front of these shears, Fig. 3, shows the measuring scale at the top indicating directly the width of cut. These shears will cut a maximum width of 86 inches. All gearing is of cast steel, machine-cut from the solid. The blades are of special tool steel, hollow ground and reversible. The blade shafts are of high carbon steel, and run in adjustable gunmetal bearings of great length, the adjustments being conveniently arranged and visible.

The large end cutting shear following the rotary shear, is a sound heavy tool, similar in design to the 66 x 1-inch shear already described, but capable of cutting plate 86 inches wide and 1½ inch thick. This unit also is built in massive proportions. Two cutting speeds of 14 and 25 cuts per minute are provided, with the usual clutch for providing an idle stroke if desired. The blades are reversible, giving four cutting edges before regrinding is necessary.

The final roller table, behind these shears, is equipped with motor driven throw-off arms lifting between the rollers, which will clear material as fast as the other units can finish it.

Discusses Die Casting

The place of die casting in industry was the subject of a paper presented before a meeting of Connecticut engineers at New Britain recently by Charles Pack, Doehler Die Casting Co., Brooklyn, N. Y. The speaker gave a brief description of the die casting process and by slides showed many new uses and interesting application. The process requires: 1. A die casting machine capable of holding the molten metal under pressure; 2. a metallic mold or die properly con- 3. a suitable alloy to use for the casting.

These three factors are interdependent the speaker pointed out. The best die casting machine built will not produce satisfactory castings from the best die casting alloy known if the die has not been properly designed. A die that is properly designed must have the correct location of the gate, must be well vented, and must have suitable means for rapid ejection of the casting.

Arc Welding of Tanks Proves Economical

(*Concluded from Page* 1647)

quired to form the bottom. The circle cut on the bottom was made from one-half to three-quarter inch larger than the line indicated for placement of shell sheets. The bottom ring sheets were then sheared on both sides and one end. One side or one edge of the bottom ring sheets was placed on a circular line on the bottom, first tacked about one-foot spaces; after the bottom ring was set up and tacked, other rings were marked out. All sheets in rings above the bottom were sheared on one side and one end. In locating each of these the sheets were placed inside the ring below, permitting an overlap of approximately 1½ inches. The welders thus were enabled to burn holes with the acetylene torch and insert bolts so as to draw the sheets together and make each sheet or ring fit perfectly.

After all sheets were raised, bolted and tacked, the continuous welding process proceeded on both sides of the lowest ring where it connected with the tank bottom. All other seams were welded on the outside only. At points where bolts were used to draw the shell together, the bolts were replaced with rivets after the steel had been tacked into place. Since the only bolts or rivets necessary were those used to fit the iron into place, few were required in the entire construction.

In all the 15 tanks built from the old material, only two or three small pin-hole leaks appeared during the tests which followed. These leaks were on the vertical seams where it seemed most difficult for welders to handle the metal.

It has since been found impractical to attempt the rebuilding of large tanks by this method, although arc welding has been used with much success in repairing their bottoms. In this type of work welders fill the old rivet holes with metal instead of cutting them off as in the case of smaller tank work. The experience of this company has been that the largest tank which can be handled conveniently in rebuilding by the arc welding process is the 500-barrel size.

Because of the comparatively recent development of the arc welding method in oil field tank construction and repair work, there has been little opportunity for the compilation of comparative figures on this and former methods. However, it is known that the saving in time, labor and material has been considerable. Part of the saving in from the use of scrap.

Editorials

High Steel Output Depresses Scrap

TO CONSUMERS the high rate of pig iron and finished steel production in 1925 is gladsome news but to the iron and steel scrap industry it is only a harbinger of additional scrap to an already glutted market. Through a large part of the year scrap prices have reflected the condition of heavy supply and it seems likely that the buyers' market will carry over into the early part of 1926.

It has been estimated that as soon as 90 days after finished steel leaves the mill the scrap occasioned by its fabrication into a finished product or the material it replaces begins to find its way back. With new railroad construction a negligible factor, every rail shipped means the relegation of some existing rail to a subordinate service and the scrapping of a rail at the bottom of the cycle of services.

The farm implement industry has enjoyed the best year since 1920, and a good share of this output being for replacement purposes, the country collectors of scrap are throwing an increasing number of plows and cultivators on their piles. The record production of automobiles is resulting in an accelerated rate of scrapping existing automotive equipment. Probably the only consolation for the scrap industry is that the retirement of freight cars has been below normal.

Each year normally sees an accretion in the potential supply of scrap, but the spurt in raw material production this year has had a direct reflex in stepping up the rate of scrap production and has further confused the industry.

Imports Give Favorable Sign

RECENT developments in foreign trade have raised a new bogey to bother the serenity of some business observers. It is noted that in November, imports increased to $378,000,000 compared with $375,000,000 in October. Exports, on the other hand, declined to $448,000,000 against $493,000,000 in the preceding month. Exports exceeded imports by only 16 per cent, whereas in November, 1924, they were ahead by 66 per cent. Does this relative crowding forward of imports represent an unfavorable condition?

Without more intimate knowledge of the details of imported commodities and their sources, a completely satisfactory answer is difficult. But enough data are at hand to indicate that a huge part of the gain in imports represents raw materials. These materials are being purchased by domestic manufacturers in expectation of continued good business. In the spring of 1923 the rising tide of imports was a truthful sign of good business in this country. That indication apparently is holding in the present instance.

New Export Fields Developing

ANALYSIS of foreign trade as it is being developed by American iron and steel interests reveals an increasing importance of transactions with British India. Imports by American consumers during 1925 have in 11 months set a new high record, exceeding by over 100,000 tons the highest previous yearly total. This increase has been due largely to imports of pig iron, of which 388,092 tons was received in 11 months of 1925. British India dominated this trade, shipping 170,773 tons, compared with 56,535 tons in 1925. The increased exports by the British colony have been instrumental in enlarging the American exports. The tonnage shipped to British India in November was considerably over that of October, including 3586 tons of galvanized sheets and 3475 tons of tin plate, compared with 45 and 512 tons in October. All products did not gain proportionately, but increases were general.

Enforcing Unionism by Law

SUPPOSE the iron and steel works employes of Pennsylvania were organized and their union sufficiently strong to put through the legislature a bill forbidding the employment of any man not holding a competency card. To obtain such a card a man would have to go before a board, composed of union men to be sure and for any producer to employ an uncarded man the penalty would be a stiff fine.

Not compatible, of course, with the American ideal of individualism, but it is the condition, nevertheless, in which the coal mining industry of Pennsylvania and other states finds itself. To break a strike in any state where a competency act is in force is impossible. For some pretext or other a nonunion man cannot pass the tests, and for an operator to bring in even skilled miners from another state makes him a lawbreaker.

In Illinois, probably the most union-ridden coal

mining state in the country, a miner's competency act has set the seal upon the union's grip. Wherever enacted, such an act automatically bars the open shop in the coal mining industry. The argument of safety to support it is specious, as the operator has even more at stake than the miner in preventing accidents.

Only the check off system of paying wages compares with it as an evil. It is no wonder that the operators in the nonunion fields are determined to preserve their independence against the restrictive practices of unionism as they have been demonstrated in the coal industry of this country.

Associations Can Decide Own Fate

REPORTS are heard that some trade associations and groups have been exceeding their priveleges under the Supreme Court decisions of last summer in the cement and maple flooring cases as to the distribution of industrial and business statistics. It is pointed out that it behooves these associations to take note of what can be done legally in the various industries under these decisions and shape their conduct accordingly.

In deciding these two cases, the Supreme Court held that the mere collection and dissemination of business statistics by a trade association, unaccompanied by concerted action or agreement in the use of the statistics in price arrangements, does not constitute a violation of the anti-trust act.

Legislative action should not be necessary, in view of the clarity of distinction as to distribution of vital business statistics and their use as outlined in the Supreme Court decisions. For congress to seek to take a hand would make matters much worse. Any legislation on the subject of trade associations certainly would be entirely superfluous and might serve only to muddle matters again.

The position of the department of justice under the Supreme Court decisions brings about a uniformity of policy and practice that will be of assistance to business men who desire to use cooperative methods to eliminate waste and unfair practices in industry and at the same time to keep strictly within the law.

Trade associations should take sound legal advice as to what constitutes their rights in the use of statistics.

It should not become necessary for the government to interfere. The policy has been laid down and it should be final for all sensible people.

What Our Readers Are Thinking

Strategy of Competition Changing

To the Editor:

IN AN editorial that appeared in IRON TRADE REVIEW Dec. 17 entitled "Meet Competition Between Industries," you make reference to a prominent New York banker.

For a long time past I have pointed out the fact that competition was changing from that between individuals to a competitive fight between industries. This in my opinion is the big idea, and unless individual members of an industry get this thought into their system, they will be helplessly lost unless they take steps to organize that industry and thereby protect its interests.

CHARLES F. ABBOTT,
Executive director, American Institute of Steel Construction.

New York, Dec. 22.

At Last—the Communist Defined

IF IT were not for the bad effect that he has upon people who are not as well off as everyone would like them to be, and who can never be better off because of his pernicious activities, the socialist in Canada could be ignored and his theories treated as a joke as the Corn Law Rhymer did when he wrote:

"What is a Communist? One that hath yearnings
For equal division of unequal earnings.
Idler or bungler or both, he is willing
To fork out his penny and pocket your shilling."

A more modern if less elegant expression of the same idea is that a Communist is a man that will share his thirst with you if you will share your drink with him.—*Beses Bulletin, of the British Empire Steel Corp.*

Predicts Continued Motor Prosperity

WITHOUT attempting to forecast too far into the future of the motor car industry, it now looks as if the the first quarter will be better than the corresponding period of 1925. With current prosperous conditions in many lines of industry and steady employment at high wages, all indications are that the public will buy at least as many motor vehicles during the coming year as this year and if manufacturers keep their feet on the ground and do not overproduce, there seems no reason why the industry, as a whole, cannot operate on satisfactory profits.

The impression in some quarters that there has been a heavy overproduction this year, is not borne out by figures I have received which show a very healthy condition. It is normal to expect accumulation of unsold cars at this season.

General Motors production schedules are determined by volume of retail buying, judged normally. It is our intention to maintain this policy. The corporation is expanding its operations in the export trade and we expect to attain a volume in overseas markets next year of $100,000,000.—A. P. SLOAN JR., *president General Motors Corp.*

The Readers' Page

Vol. LXXVII, No. 27 IRON TRADE REVIEW Dec. 31, 1925

Watch for IRON TRADE REVIEW'S Great Annual

ANY one of a score or more features of IRON TRADE REVIEW'S yearbook of industry, to be published Jan. 7, might be called to the reader's attention as one of special merit, but the issue as a whole must be examined and read for an appreciation of what it contains. Each year marks considerable improvement in the annual statistical number and while in past years it has been massive and thorough, the new number surpasses all others, in the selection of subjects and their treatment, and the comprehensive scope of statistical information. Of 128 pages devoted to editorial matter, 30 contain prices and statistics. There will be a leading article on better marketing methods and distribution; one on steel consumption, carrying forward the record as originated by this publication five years ago; an analysis of the alloy steel industry; world production figures and market digests.

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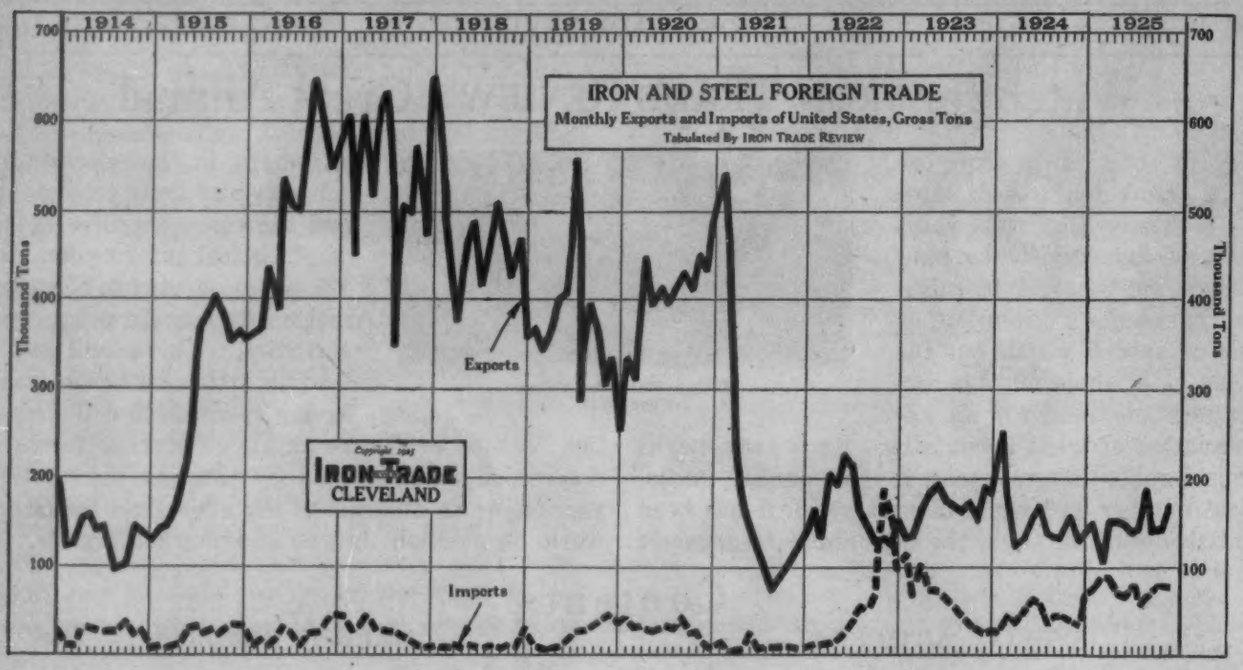
The Business Trend



Prosperity Reflected In Big Imports

By JOHN W. HILL, Financial Editor

DURING 1925 there have been important increases in both American exports and imports. Most attention has been centered upon the gain in imports. These rose nearly 14 per cent in the 11 months ended Nov. 30, compared with an increase of only 7 per cent for exports.

FROM this fact some gloomy conclusions have been drawn. It has been said that America's debtors now are beginning the inevitable process of paying off their debts by sending goods. Soon, it is predicted by a few observers, the country will be deluged with cheap foreign products. That may be a development of the future, but a study of the figures of foreign trade does not indicate that it is now at hand.

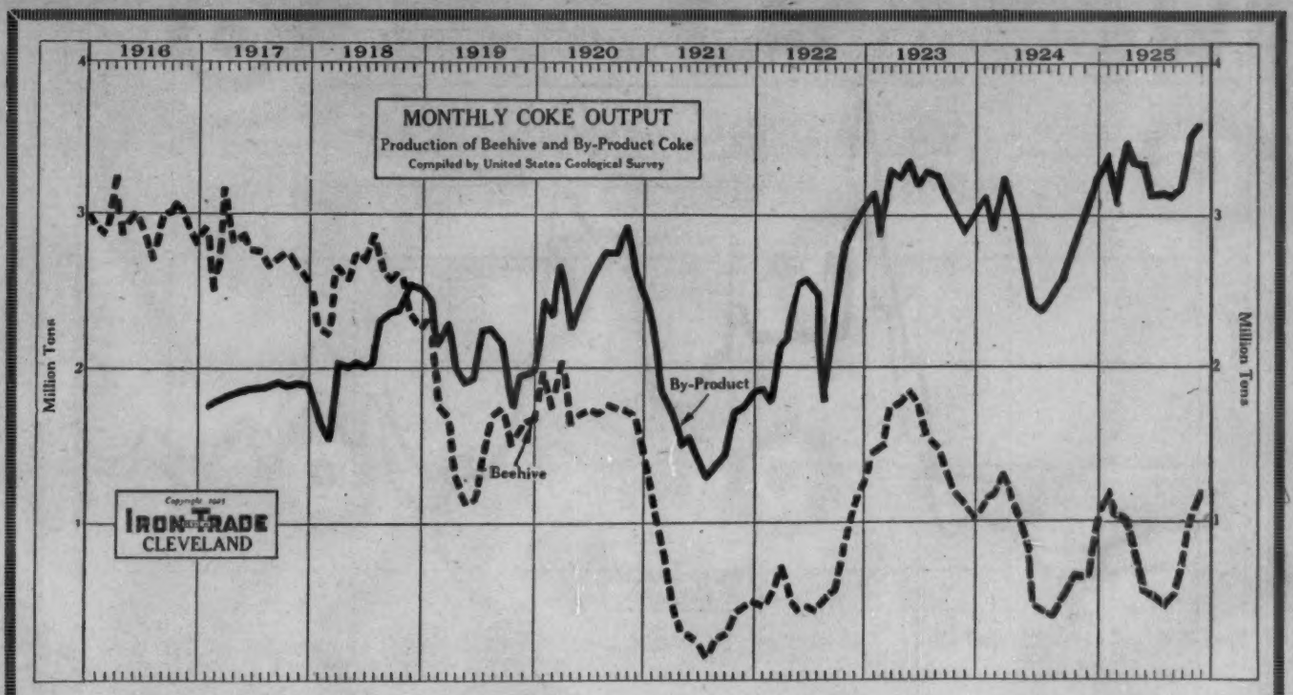
WHAT has been happening this year has been a stimulation of imports of raw materials. This is a reflection of prosperity and expectations of continued prosperity, on the part of American manufacturers. For the 11 completed months, crude material imports have amounted to 40 per cent of all imports against 33.6 per cent one year before. Finished goods imports have amounted to only 18.9 per cent of the total against 20.8 per cent in 1924.

AMONG the raw material products imported in greater quantities have been iron and steel. During 11 months, imports of iron and steel products have amounted to 844,958 tons against 566,281 tons in all of 1924 and 734,734 tons in the best previous full year of 1923.

ALTHOUGH the tide of iron and steel imports has risen the domestic industry has suffered no visible injury. Production and demand in fact have seen great expansion. Low producing costs abroad have enabled foreign makers of pig iron and some other products to undersell American producers in some sections. This has caused imports of iron and steel declined to 135,800 tons in 1921, domestic producers could derive little comducers.

YET nothing can be read into the record of iron and steel imports of 1925 but great prosperity for the country. Far from being an alarming development, it is an encouraging one. When imports of iron and steel declined to 135,800 in 1921, domestic producers could derive little comfort from that fact. Depression had demoralized their own sales. In 1923 iron and steel imports increased and so did home outputs.

The Business Trend

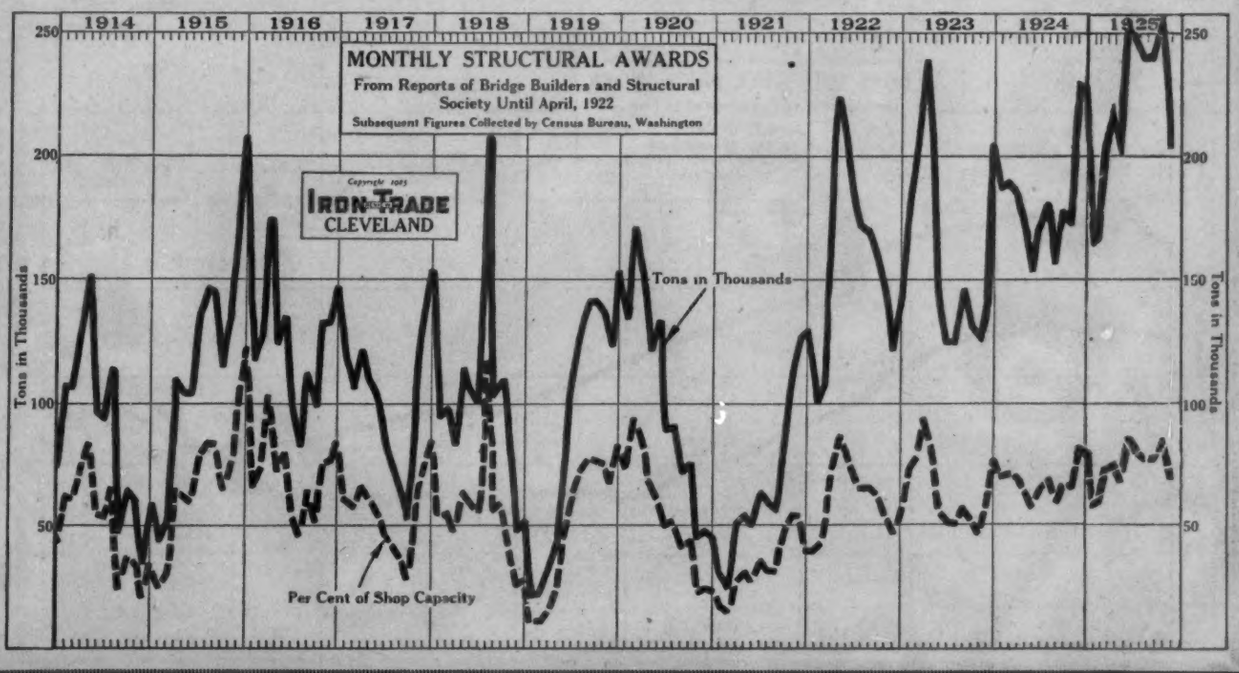


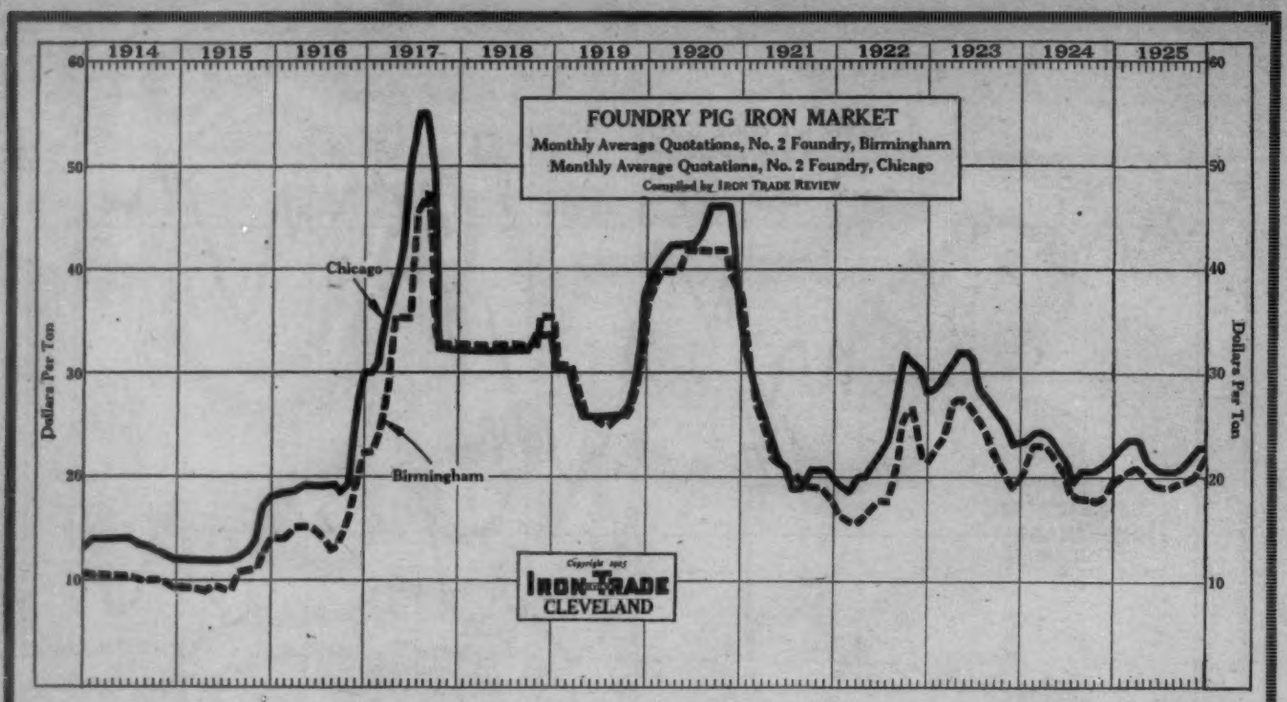
Coke Output

NOVEMBER brought the highest output of by product coke on record. Of 80 plants in the country, 74 were active. They produced 3,557,000 tons of coke, against 3,402,000 tons in November. This was an increase 4.6 per cent. Beehive coke output totaled 1,213,000 tons against 1,006,000, a gain of 20 per cent. The monthly average production of beehive coke in 1924 was 806,000 tons. Of the total coke produced in November 83 per cent was made in plants associated with iron furnaces in the country.

Structural Awards

SEASONAL influences making for contraction are discernible in the November record by structural steel awards as reported by the department of commerce. For the period the computed tonnage of bookings was 203,000 tons, representing 70 per cent of shop capacity. This compares with 255,200 tons in October, representing 88 per cent of shop capacity. October's showing marked the highest volume on record, with the exception of last April. In November 1924 computed tonnage was 240,700 tons.



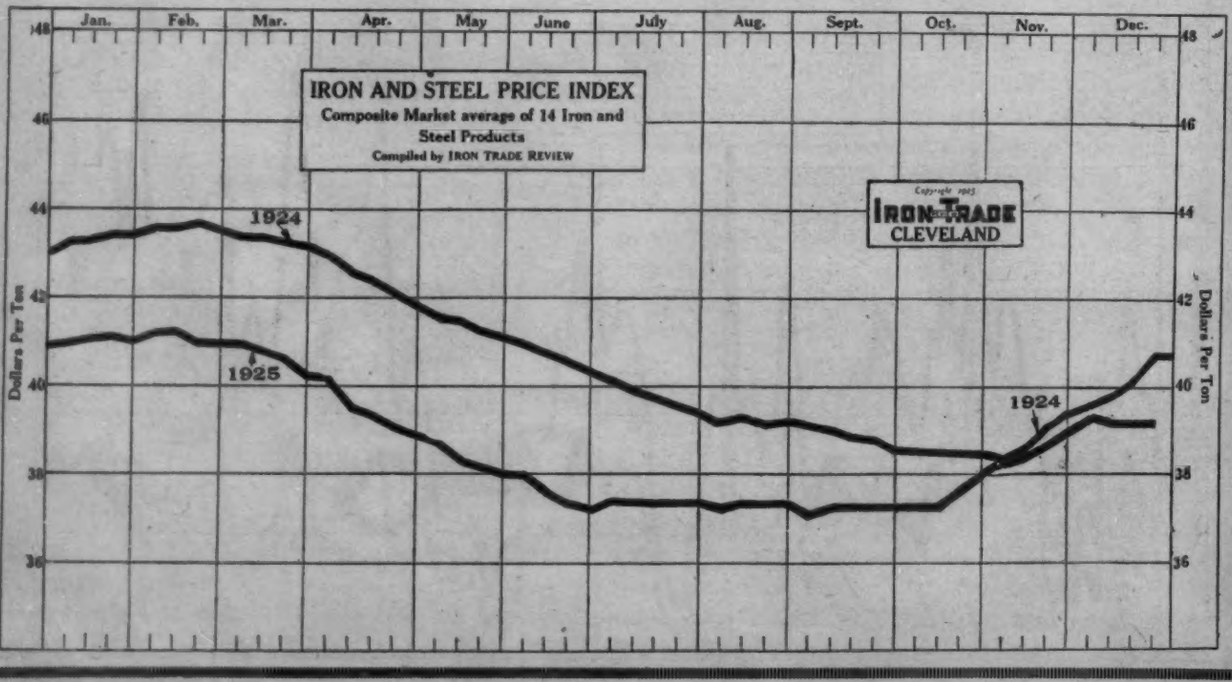


Foundry Iron Market

ALTHOUGH the general average of iron and steel prices remains slightly below its level of one year ago, foundry pig iron has worked a trifle higher. The average of Chicago No. 2 foundry iron in December was $23 a ton. This compared with $22.40 a ton for this grade in December 1924. The average of Birmingham No. 2 foundry iron in December was a little under $22 a ton. This compared with $19.80 a ton for that grade in December 1924. The gain for southern iron is greate rthan that for Chicago.

Steel Prices

IRON TRADE REVIEW composite market average of 14 iron and steel prices is closing the year a neck behind one year ago. The average has been holding at $39.10 during December and this compares with about $40.50 one year ago. The composite has been holding steady since June and tending upward since the middle of October. At its lowest ebb during the summer the average was only 42 per cent above the 1913 average. It is now about 49 per cent above that level. Continued firmness is indicated.



ECONOMIC POSITION
UNITED STATES AND THE WORLD

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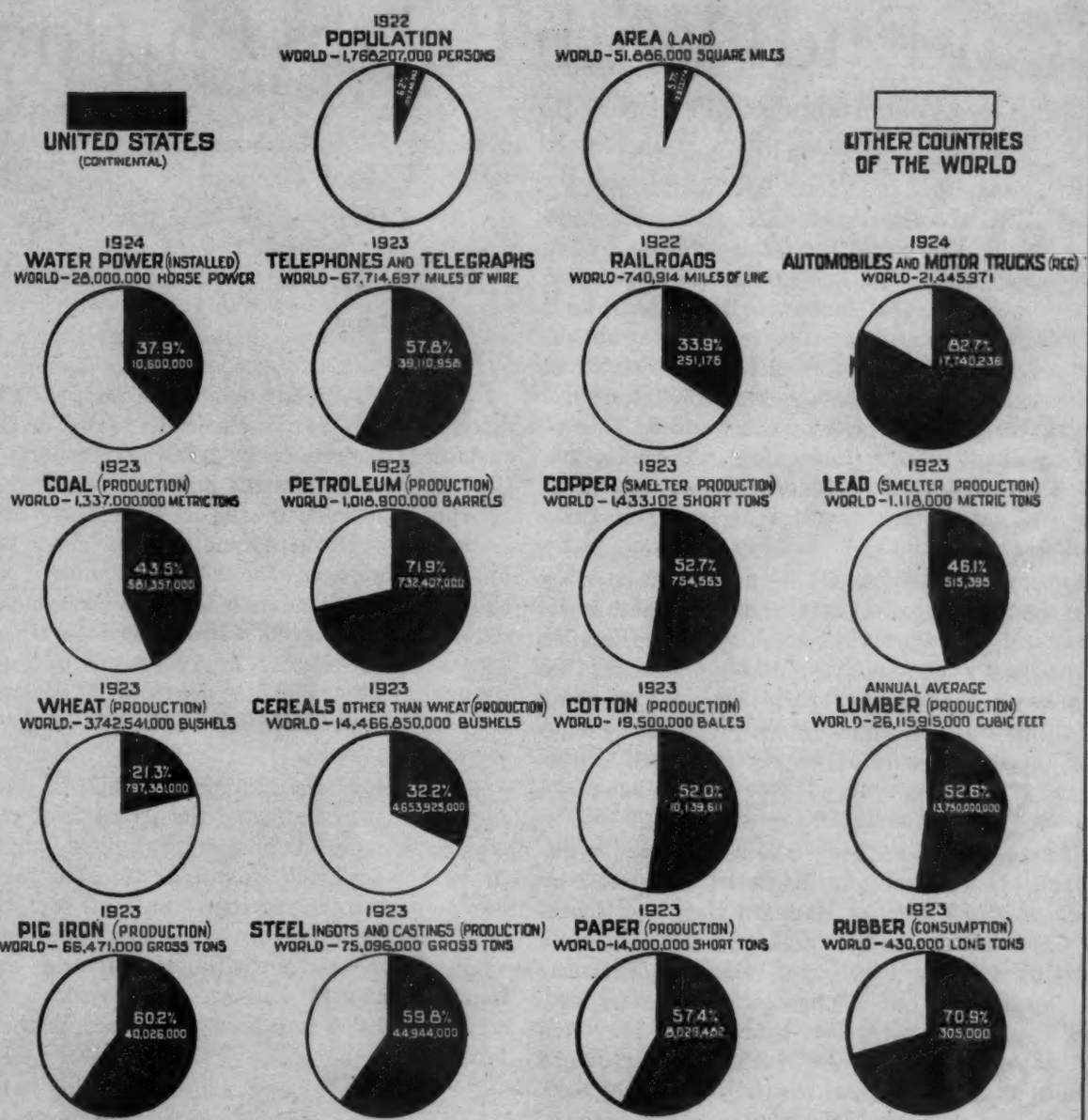


Unless otherwise noted, the following sources refer to both United States and world figures. Population figures are from United States Statistical Abstract. Area figures are those of the Smithsonian Institute. Power from United States Geological Survey. Telephones and Telegraphs from American Telephone and Telegraph Company (only land telegraphs included). Railroads from Bureau of Railway Economics, but from the Archiv für Eisenbahnwesen for countries other than the United States. Automobiles and Motor Trucks from United States Department of Commerce. Coal from United States Geological Survey (includes lignite). Petroleum from United States Geological Survey (barrels of 42 gallons). Copper from American Bureau of Metal Statistics. Lead from United States Geological Survey. Wheat, Cereals (other than wheat) and Cotton from United States Department of Agriculture. Cereals (other than wheat) includes corn, oats, barley, rye and rice. Cotton is in terms of bales of 478 lbs. net. Lumber from United States Forest Service (represents saw timber). Pig Iron and Steel Ingots from the Iron Trade Review. Paper from United States Census Bureau for United States; from the American Paper and Pulp Association for world. Rubber from the United States Department of Commerce.

Year Ends With Bright Outlook

Mills Are Comfortably Filled and New Business Is Flowing Freely—Steel Production in 1925 Establishes New High Record of About 45,500,000 Tons—Shutdowns Are Short—Railroad Buying Offers Good Promise

UNUSUAL activity for the season and bright prospects for the future have brought to an auspicious close the greatest tonnage year in steel history. December's high rate of operations have insured the establishment of a new record for all time of steel production of approximately 45,500,000 tons exceeding the previous peak of the wartime year of 1917 by about 500,000 tons. Pig iron production, however, failed to keep pace and with a total of about 36,500,000 tons ranked below 1916, 1917, 1918, 1920 and 1923.

Shutdowns over the Christmas holidays were about of normal extent but most mills and steelworks will run through New Years day because of the heavy demands for steel. Chicago this week has jacked up its operations another point to 88 per cent of ingot capacity. The Youngstown territory keeps at 85 per cent with Pittsburgh at 90 per cent. These percentages are equivalent to full operations.

The constantly growing strength in the semifinished market again is displayed this week by a sale of 15,000 tons of standard slabs for Northern Ohio delivery at $38 mill. Smaller lots were sold this week at $40, base. Further sheet bar sales are lacking but Youngstown makers indicate they would not accept less than $37 if they find any tonnage available. A Cleveland maker named as high as $40 on several inquiries for sheet bars.

Stacks Point to Normal

The high stage which general industrial activity has reached is measured by the blast furnace capacity now in action. Preliminary figures reveal that in December a net gain of nine stacks was made in the operating list raising the total to 229. This is equivalent to a shade under 60 per cent of the total number of furnaces in the country, registering a normal condition of business according to the Ayres theory which has gained for itself a keen public interest.

Market Is Flexible

Mills are beginning the new year comfortably filled with business for a number of weeks ahead and new orders keep appearing in good volume. In fact, the Chicago district which has been leading the market in sustained week-to-week bookings reports even Christmas week tonnage measured up to the pace of the past month and considerably exceeded shipments. Notwithstanding the good flow of business, however, the situation over supplies shows no tightness with the possible exception of semifinished material. From time to time gaps appear in mill schedules. This tends to keep conditions flexible and to preserve a conservative tone to the market which appears to be one of its soundest features.

Resumption of a number of additional merchant furnaces has not affected the strength of pig iron which remains firm despite limited buying at present. Ordering forward of iron for early January is on the increase. Sales of foundry iron at $21 valley have been made in competition with valley furnaces. More Buffalo furnaces are asking $22 for first quarter. The week's principal sale was 11,000 tons to a pipemaker in the Pittsburgh district.

Big Buying Promised

Heavy railroad buying which is counted upon more in the future to keep the market of large dimensions, is indicated by present prospects. Fully 20,000 cars are reported in sight for early award among western roads. These include 5000 for the Chicago & Northwestern, 3000 for the Illinois Central, 2500 to 3000 for the Rock Island and other lots. The Baltimore & Ohio has out a new inquiry for 2000 cars. Chicago mills in the week took

37,000 kegs of track spikes and bolts. Locomotive orders this week have been few.

Cable reports tell of the starting in London of negotiations for an international association in steel rails. French production of iron and steel now is proving insufficient, reflecting internal improvement, and prices are rising.

IRON TRADE REVIEW composite of fourteen leading iron and steel products with a gain in the final week still finishes the year well below the closing period of 1924. The week's figure is $39.24. One year ago it was $40.70 and two years ago $43.02.

Prices, Present and Past

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	Dec. 30, 1925	Nov. 1925	Sept. 1925	Dec. 1924
PIG IRON				
Bessemer, valley, del., Pittsburgh	$22.76	22.61	21.01	23.51
Basic, valley	20.00	19.85	18.25	20.75
Basic, eastern del., eastern Pa.	23.00	22.70	20.50	23.25
*No. 2 foundry, del., Pittsburgh	22.26	22.11	20.51	22.61
No. 2 foundry, Chicago	23.00	22.75	21.10	22.40
*Southern, No. 2, Birmingham	22.00	21.00	18.50	19.80
*Southern Ohio, No. 2 Ironton	21.50	20.90	19.50	21.80
**No. 2X, Virginia furnace	24.00	23.00	23.00	24.50
**No. 2X, eastern, del. Phila.	24.26	24.01	21.86	24.88
Malleable, valley	20.50	20.35	18.75	21.10
Malleable, Chicago	23.00	22.75	21.10	22.40
Lake Superior charcoal, Chicago	29.04	29.04	29.04	29.04
Gray forge, val., del. Pittsburgh	21.76	21.61	19.86	22.01
Ferromanganese, del., Pittsburgh	119.79	119.79	119.79	109.79
*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.				
COKE				
Connellsville furnace, ovens	4.25	6.35	3.45	3.70
Connellsville foundry, ovens	5.00	6.85	4.20	4.60
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngstown	37.00	35.25	34.25	39.10
Sheet bars, open-hearth, Pittsburgh	37.00	35.25	35.00	37.75
Billets, open-hearth, Pittsburgh	36.00	35.00	35.00	35.60
Wire rods, Pittsburgh	45.00	45.50	45.00	48.00
FINISHED MATERIAL				
Steel bars, Pittsburgh	2.00	2.00	1.95	2.10
Steel bars, Chicago	2.10	2.10	2.10	2.10
Steel bars, Philadelphia	2.32	2.32	2.27	2.32
Iron bars, Philadelphia	2.22	2.22	2.12	2.18
Iron bars, Chicago, mill	2.00	2.00	1.90	2.00
Beams, Pittsburgh	1.90	1.95	1.90	2.05
Beams, Philadelphia	2.17	2.17	2.17	2.32
Beams, Chicago	2.10	2.10	2.10	2.20
Tank plates, Pittsburgh	1.90	1.85	1.80	1.90
Tank plates, Philadelphia	2.12	1.92	2.07	2.22
Tank plates, Chicago	2.10	2.10	2.10	2.20
Sheets, black, No. 28, Pittsburgh	3.35	3.25	3.15	3.50
Sheets, blue anl., No. 10, Pittsburgh	2.50	2.40	2.30	2.65
Sheets, galvanized, No. 28, Pittsburgh	4.60	4.50	4.20	4.65
Sheets, black, No. 28, Chicago	3.50	3.45	3.35	3.75
Sheets, blue anl. No. 10, Chicago	2.65	2.60	2.45	2.85
Sheets, galvanized, No. 28, Chicago	4.75	4.70	4.45	4.90
Wire nails, Pittsburgh	2.65	2.65	2.65	2.80
Wire nails, Chicago	2.70	2.70	2.70	3.00
Tin plate per base box, Pittsburgh	$5.50	5.50	5.50	5.50
OLD MATERIAL				
Heavy melting steel, Pittsburgh	19.00	19.50	19.00	21.00
Heavy melting steel, eastern Pa.	17.50	17.60	17.25	20.50
Heavy melting steel, Chicago	15.25	16.40	16.45	18.65
No. 1 wrought, Chicago	15.00	18.75	18.25	20.10
No. 1 wrought, Chicago	15.00	17.70	17.05	18.75
Rails for rolling, Chicago	18.00	19.40	19.00	19.90

Composite Market Average

The Fourteen Leading Iron and Steel Products Included are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

This week (Dec. 30, 1925)	**$39.24**
Last week (Dec. 23, 1925)	**39.10**
One month ago (November, 1925)	**38.73**
Three months ago (September, 1925)	**37.35**
One year ago (December, 1924)	**40.21**
Ten years ago (December, 1915)	**31.56**
Twelve years ago (December, 1913)	**23.39**

Late News Flashes

New York Central in Market

New York, Dec. 29.—The New York Central railroad is inquiring for its usual first quarter requirements of plates, shapes, bars, sheets, axles, wire, billets, etc. Bids are going in Dec. 30.

Chicago Makes Another Gain

Chicago, Dec. 29.—Steel ingot operations in the Chicago district have gained another point and will average 88 per cent this week. None of the Chicago mills will be down New Years day, Twenty-five out of 35 steel works and 8 out of 10 merchant stacks are active.

Eastern Shutdowns Are Short

Philadelphia, Dec. 29.—Shutdowns among eastern mills during the holidays have been short due to the pressing demands for steel. Most of the mills were shut down two to four days over the Christmas holidays but will operate New Years day. In the most extreme cases cessations are not over a week in length.

Valley Makers Run New Years

Youngstown, Dec. 29.—All steelmakers in this district resumed operations following a three days' suspension over the holidays. District steelworks operation this week is 85 per cent, the same as a week ago. No shutdowns are planned for New Years day. Sheet mill operation is at 80 per cent compared with 89 per cent last week, one plant being idle for repairs. Barmakers have 90 per cent of rolling mill equipment engaged. Tin mills are operating full while 90 per cent of strip mill capacity is scheduled.

Judge Gary Sees Good Business in 1926

New York, Dec. 29.—Sound conditions and the co-operative attitude of the present administration will help make 1926 a good business year, according to Judge E. H. Gary, chairman of the United States Steel Corp. in an interview with the *New York Times*. He said, "At present the demand for iron and steel products is large and growing in strength. Selling prices are improving somewhat and there is reason to expect they soon will yield to most manufacturers considerable profit. The prospects of this industry for 1926 now seem to be very good. Unless some unforeseen circumstances arise to prevent, the general business situation in the United States during the coming year should be satisfactory." Judge Gary adds, "The business of the manufacturers of the iron and steel industry of the United States during the year 1925 on the whole, may be considered good, so far as the volume is concerned."

Current Rolled Steel Prices

PRICES, CENTS PER POUND, UNLESS OTHERWISE STATED

Semifinished Material

Prices per gross ton

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$36.00 to 38.00
Pittsburgh, bessemer	36.00 to 38.00
Youngstown	35.00
Philadelphia	40.30 to 41.30
Chicago	35.00
Forging, Pittsburgh	40.00 to 41.00
Forging, Philadelphia	45.30 to 46.30

SHEET BARS

Pittsburgh	$36.00 to 38.00
Youngstown	36.00 to 38.00

SLABS

Pittsburgh	$36.00 to 38.00
Youngstown	36.00 to 38.00

WIRE RODS

⅛-inch and finer

Pittsburgh	$45.00
Cleveland	45.00
Chicago	47.00

Standard extras, $2.50 per ton over ⅜-inch; $5 for screw stock; $15 for acid wire rods. Carbon extras, $3 for 0.20 to 0.40; $6 for 0.41 to 0.55; $7.50 for 0.56 to 0.75; $10 over 0.75.

SKELP

Grooved skelp, Pittsburgh	1.90c
Universal skelp, Pittsburgh	1.90c
Sheared skelp, Pittsburgh	1.90c

Structural Shapes

Pittsburgh	1.90c to 2.00c
Philadelphia	1.96c to 2.32c
New York	2.14c to 2.34c
Chicago	2.10c
Cleveland	2.09c to 2.19c
Birmingham	2.05c to 2.15c

Steel Plates

Pittsburgh	1.90c to 2.00c
Philadelphia	2.07c to 2.12c
New York	2.00c to 2.14c
Chicago	2.10c
Cleveland	1.99c to 2.09c
Birmingham	2.05c to 2.15c

Iron and Steel Bars

Pittsburgh, soft steel	2.00c to 2.10c
Pittsburgh, cold finishing	2.15c to 2.25c
Pittsburgh, forging quality	2.15c to 2.25c
Philadelphia, soft steel	2.22c
New York, soft steel	2.24c
Chicago, soft steel	2.10c
Cleveland, soft steel	2.19c
Birmingham, soft steel	2.15c to 2.25c
San Francisco, soft steel	2.60c
Pittsburgh, refined iron	3.00c to 4.50c
Pittsburgh, reinforcing billet	2.00c to 2.10c
Youngstown, reinf. billet, base	1.90c to 2.00c
Chicago, rail steel	2.00c to 2.10c
Mill rail steel	1.80c to 1.90c
Philadelphia, common iron	2.17c to 2.22c
New York, common iron	2.19c to 2.24c
Chicago, common iron	2.00c

Hoops, Bands, Strips

Hoops, Pittsburgh, 6 inches and under	2.50c
Bands, Pittsburgh, 6 inches and under	2.50c
Bands, Pittsburgh over 6 in.	2.30c
Hot rolled strip steel, Pittsburgh stamping quality	2.30c to 2.50c
Hot rolled strip steel, Chicago	2.50c to 2.60c
Bands, Chicago, under 6 inches	2.60c
Bands, Chicago, 6 in. and over	2.50c
Cold rolled strip steel, hard coils, 1⅛ inches and wider by 0.100-inch and heavier, base, Pittsburgh, Cleveland	3.90c
Worcester, Mass., Chicago	4.05c to 4.15c

Cold Finished Steel

Cold finished steel bars, drawn, or rolled Pittsburgh, Chicago carloads	2.50c
Less carload	2.75c
Steel shafting turned and polished Pittsburgh, Chicago	2.60c

Screw stock base Cleveland $1 higher; and Worcester $3 higher than Pittsburgh and Chicago.

Hot Rolled Alloy Steel

Pittsburgh or Chicago

S. A. E. Series—

2300 (3½ per cent nickel)	4.60c to 4.75c
2100 (Nickel chromium)	3.60c to 3.65c
6100 (Chrome vanadium)	4.40c to 4.50c
6100 (Chrome vanad. spring)	3.85c to 4.00c
9250 (Silico-mang. spring)	3.30c to 3.40c

Billets—4 x 4 to 10 x 10, gross ton at net ton bar prices; under 4 x 4 to 2½ x 2½-inch $5 higher. Chicago base $2 higher.

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open-h'th rails, mill	43.00
Relaying rails, St. Louis	24.00 to 31.00
Relaying rails, Pittsburgh	27.00 to 30.00
Light rails, 25 to 45 mill g.t.	36.00 to 38.00
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	2.80c
Spikes, small railroad, 7-16-inch and smaller, Pitts.	3.00c
Spikes, boat and barge, Pitts.	3.25c
Spikes, railroad, Chicago	2.90c to 3.00c
Track bolts, Pitts. standard	3.90c to 4.15c
Track bolts, Chicago	3.90c to 4.15c
Tie plates, Pittsburgh	2.35c
Tie plates, Chicago	2.35c

Wire Products

To Jobbers in Carloads

F.o.b. Cleveland and Pittsburgh base

Wire nails	2.65c
Galv'd nails smaller than 1-inch	4.90c
Galv'd nails, 1-inch and over	4.65c
Plain wire	2.50c
Annealed wire	2.65c
Galvanized wire No. 9 gage	3.10c
Barbed wire, painted	3.10c
Barbed wire, galvanized	3.35c
Polished staples	3.10c
Galvanized staples	3.35c
Coated nails, count keg	1.85c
Woven wire fencing (retailers) 12½ gage, 26-in. high 7-in. bars and 12-in. stays, per 100 rods, f.o.b. Pitts.	$20.03

Joliet, DeKalb and Waukegan Ill., and Anderson, Ind., prices $1 per ton over Cleveland-Pittsburgh base on products made there; Chicago $1 higher; Duluth $2 higher and Worcester, Mass., and Fairfield, Ala., $3 higher.

Sheets

SHEET MILL BLACK

No. 28, Pittsburgh base	3.35c
No. 28, Philadelphia, delivered	3.67c
No. 28, Gary, Indiana Harbor	3.45c
No. 28, Chicago delivered	3.50c

TIN MILL, BLACK

No. 28, Pittsburgh	3.35c
No. 28, Gary base	3.45c

GALVANIZED

No. 28, Pittsburgh base	4.60c
No. 28, Philadelphia, delivered	4.92c
No. 28, Gary, Indiana Harbor	4.70c
No. 28, Chicago, delivered	4.75c

BLUE ANNEALED

No. 10, Pittsburgh base	2.50c
No. 10, Philadelphia, delivered	2.82c
No. 10, Gary, Indiana Harbor	2.60c
No. 10, Chicago, delivered	2.65c

AUTOMOBILE SHEETS

No. 22, Pittsburgh base	4.50c

Tin and Terne Plate

Prices per 100-pound box, Pittsburgh

Tin plate, coke base	$5.50

Gary, Ind. base 10 cents higher.

Long ternes, base	4.85

Iron and Steel Pipe

Base Discounts Pittsburgh and Lorain, O. to Jobbers in Carloads

	Black	Galv.
1 to 3-inch butt steel	62	50½
1 to 1½-inch, butt iron	30	13

Indiana Harbor, Ind., and Evanston, Ill., 2 points less and $4 per ton higher. Chicago delivered 2½ points less and $5 per ton higher.

Boiler Tubes

Less Carload Discounts—Carloads 4 Points Additional—F.o.b. Pittsburgh Mills

Steel 2¼ to 3¾-inch	38½
Charcoal iron, 2¼ to 4½-inch	5
Seamless hot rolled, 3¼ to 3½-inch	46 off

Chain, Piling, Cut Nails

Chain, 1-in. proof coil, Pitts.	6.00c
Sheet piling base, Pittsburgh	2.25c to 2.30c
Cut nails, c. l., f.o.b. mills	2.30c

Cast Iron Water Pipe

Prices per net ton

Class B Pipe

Four-inch, Chicago	$54.20
Six-inch and over, Chicago	50.20
Four-inch, Birmingham	46.00 to 47.00
Six-inch and over, Birmingham	42.00 to 43.00
Four-inch, New York	56.50 to 57.60
Six-inch and over, New York	51.50 to 52.60

Standard fittings, Birmingham base $110.00, 6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20; gas pipe fittings, 5 higher.

Class A pipe is $5 higher than Class B

Nuts and Bolts

F.o.b. basing points, Pittsburgh, Cleveland, Birmingham and Chicago.

Hot pressed square tapped or blank	$4.00 off list
Hot pressed hexagon tapped or blank	$4.40 off list
Cold punched square or hexagon blank	$4.10 off list
Cold punched square or hexagon tapped or blank	$4.10 off list
Cold punched U. S. S. semifinished hexagon nuts ⅝-inch and larger	75, 10 and 5 off
Cold punched U. S. S. semifinished hexagon nuts 9/16-inch and smaller	80, 10 and 5 off
Cold finished S. A. E. semifinished ⅝-inch and larger	75, 10, 10 and 5 off
Cold finished S. A. E. semifinished 9/16-inch and smaller	80, 10, 10 and 5 off

CARRIAGE BOLTS

(⅜ x 6-inch, smaller and shorter)

Rolled thread	50, 10 and 10 off
Cut thread (all sizes)	50 and 10 off
Eagle carriage bolts (Eagle list)	65 and 10 off

MACHINE BOLTS

(⅜ x 4-inch, hot pressed nuts)

Rolled thread	60 and 10 off
Cut thread (all sizes)	50, 10 and 10 off

(All sizes cold punched nuts)

Cut thread	45, 10 and 5 off
Lag screws	60, 10 and 10 off
Plow bolts Nos. 3 and 7 heads	50 and 10 off
All other standard heads	50 and 10 off plus 20 per cent
Tap bolts	30 off
Bolt ends with hot pressed nuts	50, 10 and 10 off
Bold ends with cold punched nuts	45, 10 and 5 off
Blank bolts	50, 10 and 10 off
Rough stud bolts with nuts (250 pieces or more of a size)	40 and 10 off
Stove bolts, 80, 10 and 5 off plus 2½ off in bulk.	
Tire bolts	60 and 5 off

SEMIFINISHED CASTELLATED AND SLOTTED NUTS

Per 1000, f.o.b. producer's plant, freight allowed

	S.A.E. Castellated	U.S.S. Slotted
¼	$ 4.40	$ 4.40
5/16	5.15	5.15
⅜	6.20	6.60
7/16	7.90	9.00
½	10.10	10.50
9/16	13.80	14.20
⅝	17.00	17.30
¾	23.50	24.00
⅞	36.00	36.00
1	55.50	58.00
1¼	89.00	89.00
1½	126.00	131.00
1⅝	183.50	183.50
1½	210.00	210.00

Larger sizes—Prices on application

HEXAGON CAP SCREWS

Milled	80 and 10 off
Upset	80, 10 and 10 off

SQUARE HEAD SET SCREWS

Milled	80 and 5 off
Upset	80, 10 and 5 off

Rivets

Structural rivets, carloads, Pittsburgh and Cleveland	2.60c
Structural rivets, carloads, Chicago	2.75c
**Rivets, 7/16-in. and smaller Pittsburgh, Cleveland	70 and 10 off
**Rivets, 7/16 in. and smaller Chicago	70, 10 and 5 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Washers

Wrought c.l., Chicago dist.	$6.30 to 6.40 off
Wrought c.l., Pitts. dist.	6.25 off
Lock Washers, f.o.b. factory	85 off

Pig Iron

Market Continues Firm, Despite Larger Offerings—Shipping Instructions Picking Up Again—Sales Light

LARGER production of pig iron with the resumption of a half dozen or more stacks that have been idle for some time have had no appreciable effect on prices to date. One of the Cleveland furnace companies that has been out of the market for more than a month has taken some orders at $21, valley, in competition with valley furnace interests. The weak spot occasioned by the entry into the market of the Struthers Furnace Co. apparently was of slight consequence. In southern Ohio the market is firmer, $21.50 now being minimum. At Buffalo more furnace interests are holding for $22 for first quarter. The 15,000 tons taken by the Struthers company under $20.50, valley, included 11,000 tons for a pipe manufacturer. Shipping instructions are picking up.

PITTSBURGH, Dec. 29.—While the holiday period has spread a cloak of dullness over the pig iron market producers anticipate a pick up in activity after the turn of the year. At present the market is stationary but firm. Most consumers are well covered for first quarter and are not yet ready to arrange for tonnage beyond this period. Foundries continue to operate on a hand-to-mouth basis and are buying their pig iron as needed. As far as can be learned no attractive tonnage of any grade is under inquiry. Operators of the Struthers Furnace Co. have sold 15,000 tons of iron against the output of the stack after Jan. 2 at a price slightly below the market and have restored quotations to $20.50, valley. This business included 11,000 tons for the United States Cast Iron Pipe & Foundry Co., for its Scottdale, Pa., plant. The market has undergone no change in quotations, bessemer continuing at $21, basic at $20, malleable and No. 2 foundry at $20.50 to $21, valley.

Boston, Dec. 29.—Foundry melt is unabated but pig iron buying is dull and inquiry meager. Prices are firm at $23, base eastern Pennsylvania, and $21.50, Buffalo. Continental iron is offered at $22 on cars, Boston.

Philadelphia, Dec. 29.—The total of scattered sales of foundry iron is only fair. Demand tends somewhat under offerings. The only price weakness so far is in connection with offerings of distress lots of foreign iron. Foreign foundry iron, standard as to phosphorus and sulphur, has been sold at $21.50, duty paid, here. Eastern Pennsylvania foundry iron now is $23, base furnace, plus 50-cent silicon differentials. About 3000 tons of domestic low phosphorus iron was sold at unchanged prices. Two thousand tons of eastern Pennsylvania copper-bearing, low phosphorus iron has been sold for shipment to the Pacific Coast. Virginia iron is $23 to $24, base furnace. Sales include 1100 tons to the Norfolk & Western railroad.

Buffalo, Dec. 29.—Pig iron inquiry is estimated at less than 2000 tons. One additional merchant interest has announced a $22 base for first quarter iron but furnace interests with mill connections are reported quoting $21 or $21.50. Last week's sales were small. Fifteen of 21 furnaces in the district are making iron, the number being the largest in the last half of this year.

Cleveland, Dec. 29.—An increase in the number of shipping instructions for pig iron wanted early in January, following the inventory period, is the chief comment of makers situated here. New buying continues light, not over 7000 tons being placed in the past week. More interest seems to be manifest in prospective needs. Among current inquiries is one from a nearby melter for 2500 tons of foundry iron for first quarter. One of the Cleveland furnaces that relighted a stack a week ago now is in position to supply some iron for the Cleveland market, and the price is $22, base, furnace. This is the first time in more than a month that a Cleveland furnace has indicated it could book orders. The other local interest that relighted a stack last week could supply its regular trade with small lots, but the carryover made necessary because one of its furnaces was out, with orders previously booked, place this interest practically out of the market for first quarter. A merchant interest reports some sales in the week at $20.50, valley; $21 to $22, Buffalo, and $23, lake furnace.

Chicago, Dec. 29.—Actual buying of northern No. 2 foundry and malleable iron is light but a natural result of the early start of the first quarter buying movement. Consumers display more interest in special irons. Recently the tendency has been to do business without formally issuing an inquiry, which is a sign of an active market. Some fair size deals for first half iron are pending, especially in the Michigan automobile territory. Northern No. 2 foundry and malleable iron are quoted at $23, Chicago furnace, and the technical position of the market continues strong. Inquiries for and spot buying of charcoal iron, Chicago, have been heavy. Silvery and low phosphorus iron have felt which is quoted at $29.04, delivered the added interest in the special grades.

St. Louis, Dec. 29.—Sales of pig iron have tapered down to a few scattered small lots for prompt shipment, the aggregate being under 600 tons. Shipments continue on a liberal scale. Less time will be consumed by melters in suspended operation because of holidays and inventory this season than in a number of years. Buying for first quarter has been nearly completed, and inquiry for iron beyond that period has not appeared. The market continues strong. Offer-

Pig Iron Prices

Prices per gross ton

Bessemer, valley	$21.00
Bessemer, Pittsburgh	22.76
Basic, valley	20.00
Basic, Pittsburgh	21.76
Basic, Buffalo	20.00 to 20.50
Basic, del., eastern Pa.	22.75 to 23.75
Malleable, valley	20.50
Malleable, Pittsburgh	22.26
Malleable, del., Cleveland	22.26 to 22.50
Malleable, Chicago	23.00
Malleable, Buffalo	21.00 to 22.00
Malleable, del., eastern Pa.	24.25 to 24.75
No. 1X, eastern del., Phila.	25.26 to 25.39
No. 1X, Buffalo	22.50 to 23.50
No. 1 foundry, Chicago	23.50
No. 2 foundry, valley	20.50
No. 2 foundry, Pittsburgh	22.26
No. 2 foundry, Buffalo	21.00 to 22.00
No. 2 foundry, Chicago	23.00
No. 2 foundry, Granite City	23.50 to 24.00
No. 2 foundry, Ironton fur.	21.00 to 21.50
No. 2 foundry, del., Cleveland	22.26 to 22.50
No. 2 foundry, del., Phila.	23.76 to 24.39
No. 2 foundry, N. J., tidewater	24.39 to 24.76
No. 2X, eastern del., Phila.	24.26 to 24.89
No. 2X, east. N. J., tidewater	24.89 to 25.26
No. 2X, eastern del., Boston	26.65 to 27.15
No. 2X, foundry, Buffalo furnace	21.50 to 22.50
No. 2X, Buffalo, del., Boston	26.41 to 26.91
Continental foundry f.o.b. Boston	22.00 to 22.50
India, 2.25 to 2.75 silicon, delivered cars, Boston	22.50 to 23.00
No. 2 Alabama, Birmingham	21.00 to 22.00
No. 2, Alabama, Cincinnati	24.69 to 25.69
No. 2 Tenn., Birmingham	21.00
No. 2 Tenn., Cincinnati	24.69
No. 2 southern, Philadelphia	27.01 to 28.01
No. 2 southern, Chicago	27.01 to 28.01
No. 2 southern, Chicago (barge and rail)	25.18
No. 2 southern, Boston (rail and water)	27.91 to 28.91
No. 2 southern, Cleveland	27.01 to 28.01
No. 2 southern, St. Louis	25.42 to 26.42
No. 2X, Virginia, furnace	23.00 to 24.00
No. 2X, Virginia, Phila.	28.17 to 29.17
No. 2X, Virginia, Jersey City	28.54 to 29.54
Gray forge, eastern Pa.	23.00 to 23.50
Gray forge, val. del. Pitts.	21.76
Low phos., standard, valley	28.00 to 28.50
Low phos., standard Phila.	24.76 to 27.79
Low phos., Lebanon, furnace	24.00 to 25.00
*Low Phos., English	24.00 to 25.01
Charcoal, Birmingham	30.00 to 32.00
Charcoal, Superior, Chicago	29.04

Silvery iron Jackson county, Ohio furnace, 5 per cent $26.50; 6 per cent $27.50; 7 per cent $28.50; 8 per cent $29.50; 9 per cent $31.00; 10 per cent $33.00; 11 per cent $35.00; 12 per cent $37.00; 13 per cent $39; and 14 per cent $41.00.

Bessemer ferrosilicon, Jackson county, Ohio, furnace, 10 per cent $35.00; 11 per cent $37.00; 12 per cent $39.00; 13 per cent $41.00; 14 per cent $43.00; 15 per cent $45.50; 16 per cent $48.00; 17 per cent $50.50.

*Duty paid, delivered Philadelphia consumers.

ings of southern iron are light, with quotations ranging from $22 to $23. Northern iron is firmly held on a basis of $23 Chicago for No. 2 foundry. The Midland Coke & Iron Corp., continues to quote $23.50 to $24 f.o.b. Granite City.

Cincinnati, Dec. 29.—Practically all northern foundry iron under $21.50 Ironton, appears to have disappeared and the market is firming at $21.50 for first quarter. A large interest has booked a limited tonnage at that figure. Buying at present is on a much reduced scale and recent sales did not exceed 3000 tons. The Norfolk & Western railroad bought 1100 tons of northern iron for its Roanoke shops, while the Louisville & Nashville railroad closed for 600 tons involving four different grades. A Michigan melter is in the market for 4000 tons of malleable iron, while it is reported the Buick Motor Co., Flint, Mich., is negotiating for 800 tons of 8 per cent silvery iron. Inquiry for

(*Concluded on Page* 1681)

Ferroalloys

Producers Are Sold Well Ahead—Seasons Affect Shipments

New York, Dec. 29.—The ferromanganese market is quiet. Consumers who usually issue inquiries in December are apathetic or have closed quietly for first quarter or first half. The year end finds some sellers with big order books and others who usually are sold well ahead have little tonnage to offer. Spiegeleisen sales are small but deliveries against contracts are large.

Special ferroalloys are steady in their prices. Many contracts have been made for next year, nearly all of them for the entire year on silicon and chrome, and in this respect the situation is unchanged from a year ago. Ferrotungsten is $1.12 to $1.18 a pound contained, unchanged, and little buying has been reported lately. Tungsten ore, wolframite, is $12 to $12.50 a short ton unit, asking prices, especially on futures, generally being toward the higher figure. A strong market in Europe just now is having much influence here.

Pittsburgh, Dec. 29.—Taking of inventories has interfered in some cases with shipments of ferroalloys particularly ferromanganese. However, in all these cases, it is ordered that tonnage go forward early in the new year. Buying is light. The Wheeling Mold & Foundry Co. placed 200 tons of ferromanganese with a steel interest on an exchange basis but it is understood the full market price of $115 figured. Spiegeleisen shipments which have been heavy also have been interrupted because of the season. Some buying of low grade ferrosilicon is noted with an occasional carload of 50 per cent. Of the latter, shipments against contracts at $85 freight allowed have been heavy.

Chicago, Dec. 29.—Buying of ferroalloys continues exceptionally light in view of the fact that such a small percentage of first half requirements has been placed. Ferromanganese is quoted at $115, seaboard, and spiegeleisen at $34, domestic furnace.

Ferroalloy Prices

†Ferromanganese 78 to 82 per cent, tidewater, or furnace first hand and resale	$115.00
Ferromanganese delivered Pittsburgh	119.79
Spiegeleisen 19 to 21 per cent domestic furnace or tidewater	34.00
Ferrosilicon, 50 per cent contract freight allowed	85.00
Ferrotungsten standard, cents per pound contained	1.10 to 1.18
Ferrochrome, 60 to 70 chromium, 6 to 8 carbon, cents per pound contained, delivered	11.00 to 11.50
Ferrovanadium, 30 to 40 per cent per pound estmiated, according to analysis	3.25 to 4.00
Ferro-carbon-titanium, car lots, producer's plant, net ton	200.00
Ferrophosphorus, electrolytic, per ton, carload, 17 to 19 per cent, Rockdale, Tenn., basis (18 per cent material)	91.00
Ferrophosphorus, electrolytic, per ton, carload, 23 to 25 per cent, f.o.b. Anniston, Ala., (24 per cent material)	122.50

†Duty paid

Coke

By-Product Market Stimulated, Prices Stronger—Furnace and Foundry Requirements Covered

THE recent reaction of prices in the Connellsville coke market, coupled with colder weather conditions in most parts of the country has stimulated demand for by-product fuel, and quotations generally are stronger. New demand for beehive furnace and foundry coke is quiet. Dealers are active in supplying crushed coke at $7 to $9.

Pittsburgh, Dec. 29. — Increased strength has been imparted to the beehive coke market by the rehabilitated demand for anthracite substitutes in the East. The market on standard furnace coke has been forced into an unnatural position by reason of the high prices dealers and other buyers in the East are willing to pay for crushed coke. The market on yard crushed fuel again has reached $7 and machine crushed from $8 to $9 and with such prices available on coke prepared by machine or hammers, producers naturally are disinterested in offers that may be made on the standard furnace grade. Many blast furnace interests protected themselves two weeks ago at $3.75 to $4.25. Since then one or two consumers have had to pay higher figures. The American Radiator Co., the Rogers-Brown Iron Co. and others made late entry into the market. It has been difficult to learn just what coke producers would quote on further first quarter inquiries from blast furnaces but some are naming from $4.50 to $5 as a nominal minimum; others quote $6 to $6.50. The spot market is quoted at $5.50. Foundry coke also is affected indirectly by the anthracite situation and while from $6 to $6.50 is quoted in the spot market no contract quotations are available at the moment. Most customers protected themselves at the recent low point of $5 to $5.50. Rumors of a wage settlement in the anthracite fields has made the market of a hesitant character. Coke operators point out that if a settlement were made immediately many weeks would elapse before the supply of fuel would be sufficient to satisfy demand.

Boston, Dec. 29.—Coke shipments continue heavy. The by-product foundry grade continues unchanged at $13, delivered.

New York, Dec. 29.—As the thermometer has declined coke prices have advanced. Furnace coke now is $5.75, Connellsville, and foundry fuel $6 to $6.50. Screened coke is $8.75. Good spot buying for all purposes is noted. By-product foundry coke is unchanged at $11.01 to $11.52, delivered at Newark and other northern New Jersey points.

Chicago, Dec. 29.—It seems likely the current quotation of $10.50, Chicago ovens, or $11, delivered Chicago, for by-product foundry coke will be carried over into January.

St. Louis, Dec. 28.—Demand for foundry coke is brisk, and users continue to urge prompt shipment. Reserves in users yards are light. By-product interests report continued heavy shipments, though the total is likely to fall slightly behind the record tonnage of November. Prices are unchanged.

Birmingham, Ala., Dec. 28.—Coke production is steady, and deliveries are being pushed. Quotations on the foundry grade are firm at $5.75 minimum, with $6 and $6.25 being asked. Local consumption is heavy, independent manufacturers handling much of the outside business.

Coke Prices

Beehive, Ovens

Prices per net ton

Connellsville, furnace	$4.00 to 5.00
Connellsville, foundry	5.00 to 6.00
New River foundry	7.50 to 8.00
New River furnace	6.25
Wise county furnace	6.00
Wise county foundry	7.00
Alabama foundry	5.75 to 6.50
Alabama furnace	5.50

By-Product

Foundry, Newark, N. J.; del.	$11.01 to 11.52
Foundry, Chicago, ovens	10.50
Foundry, New England, del.	13.00
Foundry, St. Louis	10.00
Foundry, Granite City, Ill.	10.00
Foundry, Birmingham	5.75 to 6.00
Foundry, Indianapolis, del.	11.25

Plates

Market Fairly Active, and Prices Steady — Pennsylvania Railroad Plans Large Purchases

OF OUTSTANDING interest in the plate market is the fact the Pennsylvania railroad is formulating a program calling for a much larger tonnage of plates and other finished material than placed by it in recent years. A considerable tonnage of locomotive plates has been placed. Mills begin the new year with fairly good operations, and prices show steadiness.

PLATE PRICES, PAGE 1666

Philadelphia, Dec. 29.—Eastern plate mills are closing the year operating substantially at 70 per cent, and scheduled three to six weeks ahead. Efforts to establish 1.80c, Pittsburgh, have not been successful in all cases. The market is 1.70c to 1.80c for first quarter, while some consumers have been able to get mills to accept additional tonnage for this year at the old price at 1.60c.

The Pennsylvania railroad is formulating an important program and expects to buy a heavier tonnage of plates in 1926 than in a number of years. It is taking prices for an indefinite tonnage of plates, bars and shapes for first quarter. The Reading railroad is expected to purchase first quarter needs soon.

Boston, Dec. 29.—Demand for plates in New England is quiet. Most producers ask 1.80c, Pittsburgh. Some offers at 1.70c, Pittsburgh, have been made, however.

New York, Dec. 29.—Platemakers are closing the year with expanding demand. Because of the sold up condition of Pittsburgh mills, eastern makers are booking more tonnage. Deliveries are more extended. Prices vary. The usual quotation is 1.80c, Pittsburgh, although 1.75c and 1.70c apply on attractive lots. On some special lots fitted into early rollings, even lower is done.

Pittsburgh, Dec. 29.—Plate fabricators are fairly busy with miscellaneous orders covering various types of tanks, boilers, etc. Large tonnages are being rolled by the mills against their orders for railroad car plates. Mills in this locality are better fixed for tonnage of this character than mills farther East and they are more inclined to maintain a stronger price attitude. They are quoting a 1.90c minimum, naming 2.00c on occasion. The largest tonnage pending here is that of the Inland Waterways Corp., Washington, involving 5100 tons for the construction of barges.

Cleveland, Dec. 29.—After several weeks of growing strength, the plate market has shown new signs of softness the past week. This has developed mainly in connection with recent orders for 4000 to 5000 tons of locomotive plates placed in this district. Some mills are quoting exceedingly low on a tank plate basis to obtain the special grades carrying attractive extras. This locomotive tonnage was divided between Pittsburgh and local mills. Developments this week indicate that 1.80c, Pittsburgh or 1.99c, Cleveland has not disappeared although generally the market has been considered from 1.85c to 1.90c, Pittsburgh.

Chicago, Dec. 29.—Plate capacity is the least taken up of the heavy finished products but makers here have business on their books for at least 30 days and specifications from car builders are coming in satisfactorily. The early months of 1926 are expected to see heavy car buying by the western roads. Water storage tanks are more in demand now than oil storage tanks. Plates are quoted at 2.10c, Chicago.

CONTRACTS PLACED

409 tons, ten tanks for Shell Oil Co., San Francisco, to Western Pipe & Steel Co.
150 tons, tanks for Union Oil Co., San Francisco, to Western Pipe & Steel Co.

CONTRACTS PENDING

100 tons, work for United States Engineers office, San Francisco; pending.

Announces Meeting Plans

A preliminary announcement of the plans for the spring meeting of the American Electrochemical society to be held at the Chicago Page hotel April 22-24 mentions a round table discussion on the comparative merits of electric and fuel fired furnaces. Dr. H. C. Cooper is chairman of the local committee. Inspection trips are scheduled to industrial plants such as Johns-Manville Co., Commonwealth Super-Power Co., Western Electric Co. and the Gary steel plants. A technical session will be held at the university of Chicago special entertainment features are being arranged for the ladies.

Semifinished

Market Continues to Gain Strength—Material Scarce—Slabs Bring $40, Pittsburgh

THE market for sheet bars, billets and slabs shows strength, notwithstanding some sales made recently at the lower end of the price range. The underlying factor is the sold-up conditions of the majority of the mills, with demand still unsatisfied. More interest is shown in forging steels. Among the week's sales are small slab tonnages at $40, base, Pittsburgh.

SEMIFINISHED STEEL PRICES, PAGE 1666

Cleveland, Dec. 29.—The market for sheet bars, billets and slabs continues to demonstrate strength, and while recent sales of sheet bars have been made at a price range of several dollars, as reported last week, the tendency is upward; and the general price now is regarded as $37, Pittsburgh. Marking the high point of the price movement to date, 100 tons of high-carbon slabs have been sold in the week at $42, Pittsburgh, by an outside mill, $2 representing a differential over the standard quality for the high carbon. Other buyers are reported to have offered to close on this basis. The Cleveland mill interest is booked up for first quarter, but is quoting nominally $40 on sheet bars, billets and slabs, Pittsburgh, Youngstown or Cleveland. Last sales of sheet bars and billets were made by this interest at $38, Pittsburgh. It is apparent from inquiries that some users have overstayed the market. The sale of 15,000 tons of ordinary standard slabs for first quarter was made this week, for northern Ohio delivery at $38, mill.

Philadelphia, Dec. 29.—First quarter billet needs generally have been covered. Rerollers are $35 to $36, Pittsburgh, with some sales higher, while forging billets are $40 to $41.

Youngstown, O., Dec. 29.—Semi-finished producers have the output of their mills for the next three months under contract and if all tonnage is specified, no sheet bars, billets or slabs will be available for the open market. Prices are nominal. Sheet bars are $36, Youngstown, although if tonnage was available, at least $37 Youngstown would be named. Standard billets and slabs are nominally quoted at $35, Youngstown. No tonnage is under inquiry at present.

Chicago, Dec. 29.—Small billet and sheet bar business taken by one maker has totaled 5000 tons. Small billets can be had at $35, base, Chicago, but one maker has taken a little business at $37.

Iron and Steel Scrap Prices

Corrected to Tuesday Noon. Gross Tons Delivered to Consumer

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	14.00 to 14.50
Boston (dealers)	12.50 to 13.00
Buffalo	18.00 to 18.50
Buffalo, No. 1	19.50
Chicago	15.00 to 15.50
Cincinnati (dealers)	13.50 to 14.00
Cleveland	17.50 to 17.75
Detroit	14.75 to 15.25
Eastern Pennsylvania	18.00 to 18.50
Bethlehem delivery	17.00 to 17.50
New York (dealers)	12.50 to 13.00
Pittsburgh	19.00 to 19.50
St. Louis	15.00 to 15.50
Valleys	18.50 to 18.75

COMPRESSED SHEETS

Buffalo	17.75 to 18.25
Chicago	13.50 to 14.00
Cleveland	15.00 to 15.75
Detroit	12.50 to 13.00
Pittsburgh	17.75 to 18.25
Valleys	17.00 to 17.50

BUNDLED SHEETS

Buffalo	15.00 to 15.50
Cincinnati (dealers)	9.50 to 10.00
Cleveland	12.50 to 12.75
Eastern Pennsylvania	15.00 to 15.50
Pittsburgh	16.75 to 17.25
St. Louis	10.00 to 10.50
Valleys	15.25 to 15.75

SHEET CLIPPINGS, LOOSE

Chicago	9.50 to 10.00
Cincinnati	9.50 to 10.00
Detroit	10.00 to 10.50

STEEL RAILS, SHORT

Birmingham	14.00 to 14.50
Buffalo	19.00 to 19.50
Chicago	19.25 to 19.75
Cincinnati (dealers)	17.00 to 17.50
Cleveland (over 6 ft.)	16.75 to 17.00
Detroit	17.00 to 17.50
St. Louis	18.25 to 18.75

STOVE PLATE

Birmingham	14.00 to 14.50
Boston (consumers)	14.00 to 14.50
Buffalo	15.00 to 15.25
Chicago	16.50 to 17.00
Cincinnati (dealers) (net)	10.00 to 10.50
Cleveland	13.75 to 14.00
Detroit (net tons)	13.25 to 13.75
Eastern Pennsylvania	15.00 to 15.50
New York (dealers)	10.50 to 12.00
Pittsburgh	14.00 to 14.50
St. Louis	15.00 to 15.50

LOW PHOSPHORUS

Buffalo	21.00 to 21.50
Cincinnati (dealers)	18.00 to 18.50
Eastern Pennsylvania	21.00 to 22.00
Pitts. billet and bloom crops	24.00 to 24.50

SHOVELING STEEL

Chicago	15.00 to 15.50
Pittsburgh	14.50 to 15.00
St. Louis	15.00 to 15.50

KNUCKLES, COUPLERS, SPRINGS

Chicago	18.00 to 18.50
Eastern Pennsylvania	20.50 to 21.50
Pittsburgh	21.50 to 22.00
St. Louis	17.00 to 17.50

FROGS, SWITCHES, GUARDS

Chicago	17.25 to 17.75
Eastern Pennsylvania	17.00 to 17.50
St. Louis	17.00 to 17.50

ANGLE BARS—STEEL

Buffalo	16.50 to 17.00
Chicago	18.25 to 18.75
St. Louis	16.00 to 16.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	13.00 to 13.50
Boston (dealers)	13.50 to 14.00
Buffalo, No. 1	15.75 to 16.25
Buffalo, No. 2	18.00 to 18.50
Chicago, No. 1	15.00 to 15.50
Chicago, No. 2	15.25 to 15.75
Cincinnati, No. 1 (dealers)	10.00 to 10.50
Cleveland, No. 1	13.75 to 14.25
Eastern Pennsylvania	18.50 to 19.00
New York, No. 1 (dealers)	15.75 to 16.25
Pittsburgh, No. 1	15.50 to 16.00
Pittsburgh, No. 2	19.00 to 19.50
St. Louis, No. 1	13.75 to 14.25
St. Louis, No. 2	15.00 to 15.50

WROUGHT PIPE

Boston (dealers)	12.00 to 12.50
Buffalo	15.00 to 15.50
Eastern Pennsylvania	16.50 to 17.00
New York (dealers)	12.50 to 12.75

YARD WROUGHT

Boston	12.00 to 12.50
Eastern Pennsylvania	17.00 to 17.50

BUSHELING

Buffalo	17.75 to 18.25
Chicago, No. 1	13.50 to 14.00
Chicago, No. 2	9.50 to 10.00
Cincinnati, No. 1 (dealers)	10.50 to 11.00
Cleveland, No. 1	14.75 to 15.00
Cleveland, No. 2	14.25 to 14.50
Eastern Pennsylvania	14.00 to 15.00
Pittsburgh, No. 1	16.00 to 16.50
St. Louis, No. 1	13.00 to 13.50

MACHINE SHOP TURNINGS

Birmingham	8.00 to 9.00
Boston (chemical)	9.50 to 10.00
Buffalo	13.25 to 13.75
Chicago	10.00 to 10.50
Cincinnati (dealers)	9.50 to 10.00
Cleveland	14.25 to 14.50
Detroit	10.50 to 11.00
Eastern Pennsylvania	15.00
New York (dealers)	11.00 to 11.50
Pittsburgh	15.00 to 15.50
St. Louis	9.00 to 9.50
Valleys	12.50 to 13.00

CAST IRON BORINGS

Birmingham (chemical)	15.00 to 16.00
Birmingham (plain)	8.00 to 9.00
Boston (chemical)	11.50 to 12.00
Boston (dealers)	9.50 to 10.00
Buffalo	13.75 to 14.25
Chicago	13.50 to 13.75
Cincinnati (dealers)	10.00 to 10.50
Cleveland	14.75 to 15.25
Detroit	11.00 to 11.50
Eastern Pennsylvania	15.00
Eastern Pennsylvania (chem.)	17.00 to 17.50
New York (dealers)	10.75 to 11.25
Pittsburgh	15.00 to 15.50
St. Louis	12.00 to 12.50
Valleys	13.50 to 13.75

MIXED BORINGS AND TURNINGS
For blast furnace use

Boston (dealers)	9.00 to 10.00
Buffalo	13.50 to 14.00
Cincinnati (dealers)	9.50 to 10.00
Cleveland	14.75 to 15.00
Detroit	11.25 to 11.75
Eastern Pennsylvania	14.00 to 14.50
New York (dealers)	10.75 to 11.25
Pittsburgh	14.50 to 15.00

PIPES AND FLUES

Chicago	12.75 to 13.25
Cincinnati (dealers)	8.50 to 9.00
Cleveland	12.25 to 12.50
St. Louis	11.50 to 12.00

RAILROAD GRATE BARS

Buffalo	14.50 to 14.75
Chicago	15.75 to 16.25
Cleveland	13.75 to 14.00
Eastern Pennsylvania	15.00 to 15.50
New York (dealers)	12.00 to 12.50
St. Louis	13.50 to 14.00

FORGE FLASHINGS

Boston (dealers)	10.00 to 10.50
Buffalo	14.50 to 15.00
Chicago	10.00 to 10.50
Cleveland (under 10 in.)	14.25 to 14.50
Cleveland (over 10 in.)	14.25 to 14.50
Detroit	10.75 to 11.25
Pittsburgh	16.00 to 16.50

FORGE SCRAP

Boston (dealers)	10.00 to 10.50
Chicago	18.50 to 19.00
Eastern Pennsylvania	15.25 to 15.75

ARCH BARS AND TRANSOMS

Chicago	23.50 to 24.00
St. Louis	21.50 to 22.00

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	10.00 to 10.50
Buffalo	15.00 to 15.50
Chicago	14.50 to 15.00
Cleveland	15.25 to 15.50
Eastern Pennsylvania	15.50 to 16.00
Pittsburgh	18.00 to 18.50
St. Louis	12.50 to 13.00

STEEL CAR AXLES

Birmingham	18.00 to 20.00
Boston (shipping point)	18.00 to 19.00
Buffalo	20.00 to 20.50
Chicago	19.25 to 19.75
Cleveland	18.00 to 18.50
Eastern Pennsylvania	24.00 to 25.00
Pittsburgh	22.50 to 23.00
St. Louis	19.00 to 19.50

SHAFTING

Boston (shipping point)	18.50 to 19.00
Chicago	20.75 to 21.25
Eastern Pennsylvania	23.00 to 23.50
New York (dealers)	18.50 to 19.50
St. Louis	17.00 to 17.50

Iron Foundry Scrap

CAR WHEELS

Birmingham, iron	16.00 to 16.50
Boston (consumers)	17.50 to 18.00
Buffalo, iron	17.00 to 17.50
Buffalo, steel	19.50 to 20.00
Chicago, iron	18.00 to 18.50
Chicago, steel	18.50 to 19.00
Cincinnati	13.00 to 13.50
Eastern Pennsylvania	18.50 to 19.00
New York iron (dealers)	15.00 to 15.50
Pittsburgh, iron	18.50 to 19.00
Pittsburgh, steel	21.50 to 22.00
St. Louis, iron	17.25 to 17.75
St. Louis, steel	18.00 to 18.25

NO. 1 CAST SCRAP

Birmingham, cupola	17.00 to 17.50
Boston	19.00 to 19.50
Buffalo	17.00 to 17.50
Chicago, No. 1 machinery	19.50 to 20.00
Chicago No. 1 railroad or agricultural	18.00 to 18.50
Cincinnati No. 1 Machinery cupola (net tons dealers)	18.00 to 18.50
Cleveland, cupola	18.00 to 18.50
Detroit (net tons)	15.00 to 15.50
Eastern Pennsylvania, cupola	18.00 to 18.50
New York, cupola (dealers)	15.00 to 15.50
Pittsburgh, cupola	17.50 to 18.00
San Francisco, delivered	20.00 to 21.00
Seattle	18.00
St. Louis, railroad	16.50 to 17.00
St. Louis, agricultural	16.25 to 16.75
St. Louis, machinery	18.50 to 19.00
Valleys	18.00 to 18.50

HEAVY CAST

Boston	16.50 to 17.00
Buffalo (breakable)	16.50 to 17.00
Cleveland	13.00 to 13.50
Detroit (automobile) (net tons)	20.00 to 20.50
Eastern Pennsylvania	17.00 to 17.50
New York (dealers)	14.50 to 15.00
Pittsburgh	17.00 to 17.50

MALLEABLE

Boston, railroad	19.00 to 19.50
Buffalo	20.00 to 20.50
Chicago, agricultural	16.75 to 17.25
Chicago, railroad	18.00 to 18.50
Cincinnati, railroad (dealers)	15.00 to 15.50
Cincinnati, agricultural (dealers)	16.50 to 17.00
Cleveland, agricultural	18.50 to 18.75
Cleveland, railroad	19.50 to 20.00
Detroit	15.50 to 16.00
Eastern Pennsylvania, railroad	17.00
Pittsburgh, railroad	20.50 to 21.00
St. Louis, agricultural	14.50 to 15.00
St. Louis	15.50 to 16.00

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	17.50 to 18.00
Boston (dealers)	13.00 to 13.50
Buffalo	18.00 to 18.50
Chicago	18.00 to 18.50
Cleveland	17.25 to 17.50
Eastern Pennsylvania	18.50 to 19.00
New York	15.50 to 16.00
Pittsburgh district	21.00 to 21.50
St. Louis	17.50 to 18.00

LOCOMOTIVE TIRES

Chicago, No. 1	18.00 to 18.50
Chicago, cut	18.75 to 19.25
St. Louis, No. 1	17.00 to 17.50

LOW PHOSPHORUS PUNCHINGS

Chicago	17.75 to 18.25
Eastern Pennsylvania	19.00 to 20.00
Pittsburgh	21.00 to 21.50

Scrap

Holiday Lull Keeps Market Quiet With Large Buying Expected to Appear Soon

CONSUMERS of iron and steel scrap show no disposition to buy material until the year turns and offers to take tonnage below the market meet no response from dealers. As a result the market is stationary and tonnages coming out are being thrown down in yards. Indications are seen that larger buying will be done soon and holders of scrap expect better demand.

Chicago, Dec. 29.—Quiet in iron and steel scrap has been further intensified by the holidays. Consumers are taking in a minimum of scrap. Dealers' yards are heavily stocked. A fair tonnage of distress material is on track and consumers seem willing enough to buy these bargains. Heavy melting steel has been bought by dealers at $15 and this grade appears to warrant a spread of $15 to $15.50, but some dealers believe the market is 25 cents higher. Most dealers believe it will be ten days or two weeks before the market recovers from its present lassitude.

Boston, Dec. 29.—New England foundries have taken a thousand tons or more of cast scrap during the week. Buying generally is quiet and prices slightly reduced on some grades. Mixed borings and turnings are down to $9.50 shipping point.

New York, Dec. 29.—Scrap prices are stationary. Trading is quiet at present but dealers generally believe there will be a revival after the first of the year, and therefore are firm in their price views. Further, the severe cold weather of late has added a strengthening note to the situation.

Philadelphia, Dec. 29.—Iron and steel scrap is quiet but heavy consumption against mill stocks indicates the probability of considerable buying for January. Prices are unchanged.

Pittsburgh, Dec. 29.—Quiet conditions in iron and steel scrap are expected to give place to active buying after inventory. A few 1000-ton lots of heavy melting steel were taken in at Midland at $19. No large sales are reported. On attractive tonnages of heavy melting dealers are asking $19.50. Heavy breakable is quoted at $17.50 and turnings at $15.50. From the general standpoint the market is holding its own.

Buffalo, Dec. 28.—Basing their optimism on predictions of heavy buying early in the first quarter Buffalo dealers have put into effect nominal price increases on a number of grades. Heavy melting steel is now held at $19 to $19.50, and dealers are emphatic in declaring Bethlehem is getting no tonnage of desirable material at its open bid of $18.

Cleveland, Dec. 29.—Iron and steel scrap is experiencing the usual year-end lull, buying on the part of dealers and consumers being practically non-existent. Impression in the trade is that little new business will develop before well toward the middle of next month. Prices are unchanged and nominal.

St. Louis, Dec. 28.—Purchasing of iron and steel scrap was listless, little interest being manifested by buyers or sellers. Melters are disposed to postpone filling their requirements until after the turn of the year.

The following lists were before the trade: Pennsylvania, railroad, 900 tons of melting rails; Missouri, Kansas & Texas, 500 tons; Union Pacific, 2500 tons; Big Four, 2500 tons; Canadian National, 1700 tons, and Dodge Bros., 4800 tons.

Detroit, Dec. 29.—The lull in activities in iron and steel as a result of the holiday season continues without appreciable change. With consumers marking time and keeping inventories as low as possible, activities are at a minimum. Prices are weak and unchanged.

Cincinnati, Dec. 29.—With buying at a standstill and prices nominal, the iron and steel scrap market presents an unsatisfactory condition. Most mills have sufficient stocks on hand or due on contracts to start the new year.

Birmingham, Ala., Dec. 28.—Few inquiries for iron and steel scrap are being received and some business is again being placed. Quotations remain firm. Heavy melting steel is quoted at $14 with one dealer reporting $1 higher.

Sheets

Market in Strong Position—Fourth Quarter Tonnage Is Shipped Out

SHEET mills generally will start the new year under satisfactory conditions as users have taken practically all of the fourth quarter tonnage they placed at lower figures, and the mills have good specifications for first quarter shipments. Operations have been resumed at the rate prevailing before Christmas. Motorcar makers are releasing tonnages; new orders are numerous.

SHEET PRICES, PAGE 1666

Youngstown, O., Dec. 29.—Practically all district sheetmakers have specifications in hand for 1925 contract business, and as the new year opens order books will contain little tonnage priced below current market levels. Some producers report the mails at the beginning of this week heavier than anticipated and that some fairly attractive orders were entered. Other makers state the tonnage received this week was of meager proportions and that the volume is not likely to show an increase until inventory and the holiday season are in the background. Indications point to a good first quarter business for high grade and common producers. Blue annealed makers have sufficient tonnage in hand to schedule mills three weeks in advance. At the present rate of operation at galvanized departments, producers have the next two and one-half weeks output clinched. Orders in hand for common black will keep district mills occupied for the next two weeks. While a good proportion of high grade sheets are under contract for first quarter shipment, many large consumers have made no arrangement for tonnage covering their requirements. Some producers booked several 400 to 450-ton orders for full pickled last week on which quick delivery was desired. Prices continue firm, blue annealed being quoted at 2.50c, black at 3.35c, galvanized at 4.60c and full finished at 4.50c. Hot mill operation this week decreased to 80 per cent, one plant being idle to permit repairs to be undertaken.

Boston, Dec. 29.—Sheet sales have held up well during the past week and recent price shading has practically disappeared. Tonnage under contract for first quarter is heavier than a year ago.

Philadelphia, Dec. 29.—Sheetmakers close the year with good order books. Some are scheduled practically for the entire first quarter. Investigation reveals that consumers generally will pay 3.25c to 3.35c, Pittsburgh, for black sheets for first quarter, with even lower in some cases. Consumers are taking most of the fourth quarter tonnage due them because of the advance in prices after Jan. 1.

Pittsburgh, Dec. 29.—Makers of sheets in this territory are regaining the ground lost last week because of the suspension over Christmas. Few mills in this district will close New Years. The average operating rate is between 90 and 95 per cent. Specifications for all three grades of common sheets are well distributed and releases are beginning to arrive from automobile makers who held up shipments because of inventory. Galvanized sheet orders are heavy and

numerous as are blue annealed, practically every consuming line experiencing good business. Black sheet orders are improving, particularly from jobbers. The quoted bases on all grades are firm, namely 2.50c on blue annealed, 3.35c on black and 4.60c on galvanized. Makers of black who recently were offering tonnage at cut prices now are quoting 3.35c. High grade tonnage is commanding 4.50c. Mills scheduled on this grade report full operating programs throughout January and commitments extending into March.

Chicago, Dec. 29.—Specifications against sheet contracts have been surprisingly heavy considering the Christmas holiday. One maker looks for production of galvanized to be curtailed because of the high price of zinc and believes that galvanized sheets should be quoted at least $3 more per ton. It is claimed that the matter of price is raised less frequently and consumers do not question 3.50c, Chicago, on black, 4.75c on galvanized and 2.65c on blue annealed.

St. Louis, Dec. 29.—Holidays and inventory have had little effect on the sheet situation. Demand continues brisk for virtually all descriptions, and purchasers are requesting quick deliveries. The leading local producer is operating full time, with sufficient business booked to maintain this for some weeks. Warehouses are filling their requirements, and demand from the general manufacturing trade is holding up. Prices are unchanged.

Tin Plate

Mills Resume on Pre-holiday Basis—Market Is Firm

TIN PLATE PRICES, PAGE 1666

Pittsburgh, Dec. 29.—Tin plate mills resumed this week on practically the same basis that prevailed prior to the Christmas shutdown. Little new business is being written, but makers have backlogs. Some producers already are fully obligated for the first half. The open market price, $5.50, is firm.

New York, Dec. 29.—Considerable tin plate business is pending. Consumers are complaining because while the base price for first quarter is unchanged at $5.50, mills are allowing them much smaller differentials than this year, and also are asking certain extras which were waived by some makers. The Texas Co. is inquiring for 100,000 boxes.

Walworth Officer Retires

John C. Bannister, vice president in charge of engineering of the Walworth Co., Boston, manufacturer of valves and fittings, was tendered a farewell dinner Dec. 21, by fellow members of his organization. He resigns effective Jan. 1 after many years in the industry. Mr. Bannister began work at the age of 15 and worked his way through high school and college and was affiliated with the National Tube Co. before going with the Walworth Co. F. H. Morehead, chief engineer of the Walworth Co. takes over Mr. Bannister's responsibilities. Howard Coonley, president, presented Mr. Bannister with a book of letters of appreciation and friendship.

Iron Imports Lower

Philadelphia, Dec. 29.—Following are the importations of iron and steel at this port for the week ended Dec. 26: 1415 tons pig iron, Calcutta; 7037 tons iron ore, Sweden; 1250 tons, ferromanganese, Calcutta; 49 tons ferroalloy, Switzerland; 22 tons hoop steel, England; 57 tons scrap brass, Canada.

Pipe

Mill Business Continues Spotty —Cast Demand Unusually Heavy—Prices Steady

BUYING of pipe from mills is spotty and operations continue around 60 per cent. Revival in demand is expected after Jan. 1. Awards of cast pipe tonnage are unusually heavy. New England lettings of the week totaled more than 20,000 tons. Little municipal buying is done in New York. French interests again took a small tonnage on the Pacific coast.

PIPE PRICES, PAGE 1666 AND 1698

Chicago, Dec. 29.—Cast iron pipe business is feeling the customary letdown late in December and both new business and shipments have tapered off. Makers are going into 1926 with heavy order books for early spring delivery. Cast pipe 6-inches and over holds at $42, Birmingham, or $50.20, Chicago, while 4-inch pipe is $54.20, Chicago.

San Francisco, Dec. 26.—French interests have been active on the Pacific Coast, B. Nicoll & Co. taking 268 tons for Alhambra, Calif. Spring buying of cast iron pipe and steel pipe is expected to be heavier.

New York, Dec. 29.—Cast pipe demand is at a slow pace, with little in the way of public lettings and not much private buying. Prices continue firm as most shops are booked ahead for several months on most sizes. Municipal demand is expected to be resumed following changes in administrations after Jan. 1.

Boston, Dec. 29.—Cast iron pipe demand holds up well in New England. Gas companies throughout the district recently have bought heavily for 1926 delivery, the total sales of the past week exceeding 20,000 tons. The city of Hartford, Conn., recently awarded from 300 to 400 tons to the Warren Foundry & Machine Co. Prices are firm.

Birmingham, Ala., Dec. 28.—Lettings of cast iron pipe during the last two weeks of the year will amount to a good tonnage. Pipe shops expect unusually good spring demand. Prices are unchanged.

CONTRACTS PLACED

268 tons, Alhambra, Calif., 6 to 16-inch class B pipe to B. Nicoll & Co. for French pipe.
221 tons, Sunnyvale, Calif., to Grinnell Co.
100 tons, Vallejo, Calif, 4 to 8-inch class B pipe to United States Cast Iron Pipe & Foundry Co. and the American Cast Iron Pipe Co.

CONTRACTS PENDING

1000 tons, Joliet, Ill.; bids Jan. 5.

Bolts, Nuts, Rivets

Specifications Good and Prices Remain Firm—Prospects Excellent

NUT AND BOLT PRICES, PAGE 1666

Cleveland, Dec. 29.—Bolt, nut and rivet makers are looking forward to unusually good business for the next few months. Current specifications are exceeding expectations for the end of the year. First quarter contracts are well signed up and quotations are firm. December business will compare favorably with that for any other month of 1925.

Philadelphia, Dec. 29.—Rivets are firmer but the price has not been defined clearly. Baldwin Locomotive Works is inquiring for a large tonnage. Prices on first quarter delivery are unchanged and firm. Practically all consumers are covered by contract for their first quarter needs.

Chicago, Dec. 29.—Increasing confidence in first quarter business is expressed by makers of bolts and nuts. Farm implement makers are ready to inaugurate the best first quarter programs in six years while automotive interests, following brief holiday shutdowns, will resume at close to capacity. If specifications in January fulfill expectations western bolt and nut works will improve their present 70 per cent operations. First quarter prices are identical with those of the previous two quarters, on the basis of 50, 10 and 10 off for large machine bolts. Large rivets are quoted

at 2.75c, Chicago, and small rivets 70, 10 and 5 off.

Seeking Medal Fund

At its recent quarterly meeting, the executive committee of the American Society for Testing Materials took steps to effect the establishment of the Charles B. Dudley Medal and Edgar Marburg Lecture as approved by the society at its June meeting. The medal is to be awarded annually to the author of a paper of outstanding merit, presented before the society and constituting an original contribution on research in engineering materials. The first award will be made in 1927 for the best paper presented in 1926. The lecture is for the purpose of having described before the society by leaders in their respective professions outstanding developments in the promotion of knowledge of engineering materials and carries with it an honorarium of $200 and a certificate. The first lecture will be given at the annual meeting next June, and the lecturer is to be selected soon. The medal and lecture are to be established by voluntary contributions, a fund of $7500 being sought.

Carbuilder Builds Buses

New York, Dec. 29.—What is perhaps the first important entry of railroad equipment companies into the automotive field is seen in the formation by the American Car & Foundry Co. of the American Car & Foundry Motors Co. The new organization incorporated in Delaware, will own a controlling interest in the Fageol Motors Co. of Ohio, Kent, O., manufacturer of motor buses and trucks and in the Hall-Scott Motor Car Co., Oakland, Calif., manufacturer of gasoline engines for motor trucks, airplanes and motor boats, and will be, in turn, controlled by the American Car & Foundry Co.

Ayers Heads Statisticians

New York, Dec. 29.—Col. L. P. Ayres, vice president of the Cleveland Trust Co. was elected president of the American Statistical association at its sixty-sixth annual meeting this week in New York. Col. Ayres has won wide distinction as a business economist and statistician. He was chief of statistics branch of the American general staff during the World War and an economic adviser with the Dawes plan commission.

To Build Branch Plant

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has purchased property in Detroit for the erection of a new building to house its district office, warehouses, and service stations.

Although plans for the new building are not definite, it is expected it will be started early in 1926. A floor space of 100,000 square feet will be necessary to take care of present requirements of the Detroit branch.

Bars

Buying Shows No Slack Through Holidays—Mills Fall Behind in Deliveries

LEADERSHIP of finished steel products continues to remain with bars and the holiday season has had a minimum of effect on the volume of new business. Jobbers are expected to add to their requirements shortly and make first quarter business heavy. Deliveries continue to be deferred, though consumers are being supplied without distress. Prices show no weakening.

BAR PRICES, PAGE 1666

Chicago, Dec. 29.—The Christmas holiday made no appreciable dent in soft steel bar business and last week compares favorably with preceding weeks. No one class of buyers seems to be more prominent and new business, which exceeds shipments by a wide margin, is the aggregate of moderate size bookings from a large number of users. Jobber buying indicates confidence in first quarter. Reinforcing bar warehouses will put in specifications shortly for one of the heaviest quarters on record. Implement makers are constantly expanding their programs. The price of 2.10c, Chicago, is firm and there are no indications of a change.

Between now and March 1, fence post manufacturers will be taking heavy shipments of rail steel bars. One Chicago Heights mill continues to operate double turn and is booked well into first quarter. Rail steel is unchanged at 2.00c to 2.10c, Chicago. Bar iron reflects improvement, but it is slight and the market is unchanged at 2.00c, Chicago.

Boston, Dec. 29.—Bar sales of the past week declined about 20 per cent below the total of the previous week, but prices hold firm at 2.00c Pittsburgh or 2.365c delivered.

Philadelphia, Dec. 29.—Specifications for steel bars are heavy and consumers generally are taking their full fourth quarter tonnages. This was sold at 1.90c Pittsburgh and indications now are apparent that nothing under 2.00c will be available after the end of the year. Quotations below 1.90c, Pittsburgh, have practically disappeared on iron bars. Some mills are asking 2.00c, Pittsburgh.

Pittsburgh, Dec. 29.—Merchant steel bar makers end the year with good order books, some running as far ahead as eight or ten weeks on some sizes. Specifications are coming from diversified sources, the automotive and allied industries remaining unusually active at this time of the year. Because the delivery situation is deferred there are not so many holdups for inventories as might otherwise be the case. While shipments still are being made against low-priced contracts, the regular open market figure of 2.00c Pittsburgh prevails and as high as 2.10c is being obtained on small lots, some of which are 18 or 20-ton carloads made up of miscellaneous sizes.

Cleveland, Dec. 29.—Holiday quietness generally has permeated the market although some mills report a considerable increase of incoming tonnage this week. Most of this is in the form of specifications for delivery after Jan. 1. The mills have in hand a large tonnage of this to be delivered in January. A considerable part of this represents the carryover from last quarter 1.90c contracts although a substantial amount of 2.00c tonnage also has been accumulated for shipment in the first quarter. The present market remains steady at 2.00c, Pittsburgh or 2.19c, Cleveland.

Cold Finished Steel

Boston, Dec. 29.—Despite the holiday season and tendency of a few buyers to postpone shipments, production and new orders of cold-finished bars are exceptionally active. A leading producer reports December tonnage ahead of any December in its history.

Subway Costs Soar

New York, Dec. 29.—Cost of subway construction in New York has increased 129 per cent in 10 years, according to a statement by the board of transportation. Steel per unit this year cost $121.67, as against $71.44 in 1915-16, a gain of 70 per cent; cast pipe, $148.68 as against $46, an increase of 233 per cent; steel rods, $112.64 as compared with $61.25, a gain of 84 per cent; and steel grating $4.23 compared with $1.71, an advance of 147 per cent. Of all the various items specified such in addition as concrete, earth excavation, brick and mastic, clay pipe, etc. the increase in cast pipe of 233 per cent was by far the greatest.

During the past year the city has expended $82,729,373, by far the largest amount for subway work within a corresponding period.

Bar Mill Wage Delayed

Youngstown, Dec. 29.—The regular examination of bar iron mill sales sheets and settlement of the puddling wage scale, which was to have been held here today, has been postponed until next Saturday by Secretary James H. Nutt, and officers of the Amalgamated association, due to unavoidable delay.

Structural Shapes

Small Tonnage Awards Continue Numerous—Inquiries Indicate Good Spring Buying—Prices Show Little Change

SPECIFICATIONS of plain structural material to mills continue at a high rate, although comprised almost entirely of small lots. Awards are featured by the closing of 3750 tons for a New York subway and 4000 tons for a theatre building there. Pending work also is featured by New York activity, new projects in other districts continuing to be slow in developing. Buying of plain material by fabricators and manufacturers is maintaining bookings at a level above that of December, 1924.

Fabricated steel prices are steady, although some shops are beginning to feel the pinch of light backlogs. Plain material continues quoted at 1.90c to 2.00c, Pittsburgh equivalent. Chicago is firm at 2.10c.

STRUCTURAL SHAPE PRICES, PAGE 1666

New York, Dec. 29.—The structural market is brisk, eight awards in the Metropolitan district taking 20,000 tons. The volume of new inquiry is somewhat restricted. Among larger awards are 3750 tons for a subway section, 2400 tons for a ventilating building for the Holland vehicular tunnel, in Jersey City. The largest pending item is 6800 tons for subway work, on which the Phoenix Bridge Co. is low bidder. Prices continue about steady on fabricated and plain materials.

Boston, Dec. 29.—Prospects for 1926 structural steel demand are fully as favorable as those for 1925. Leading fabricators now are booked for 60 days ahead. Plain material is firm at 1.90c Pittsburgh or 2.265c delivered.

Philadelphia, Dec. 29.—The recent firmer tone in the shape market is restricted to Pittsburgh prices. It is difficult to shade 1.90c, Pittsburgh, with 2.00c the usual quotation on average lots. On eastern mill business prices still range from 1.85c to 2.05c, base mill. Order books are closing for the year with operating schedules full for 4 to 12 weeks ahead.

Pittsburgh, Dec. 29.—Many small structural shape awards are made each week, fabricators reporting less interruption than usual due to the holidays. An active specifying rate against contracts with the steel mills is being maintained. Plain material prices remain at 1.90c to 2.00c Pittsburgh.

Chicago, Dec. 29.—Specifications for structural steel last week were exceeded in only one week this year. Half of this tonnage came from western freight car builders. Actual structural awards have been light but the volume of pending business has not decreased. Projects requiring 700 to 800 tons are dominant. Plain material is quoted at 2.10c, Chicago.

Cleveland, Dec. 29.—Holiday dullness continues, with few tonnages placed during the past week. No inquiries or awards of size were noted. Good business is expected to develop during the first quarter. Bids are due in Jan. 20 on the structural steel in the tower building of the Union station project. A large tonnage is required. Plain material prices are steady at 1.90c to 2.00c, Pittsburgh.

Awards Compared

	Tons
Awards this week	28,734
Awards last week	13,716
Awards two weeks ago	20,405
Average weekly awards, Nov.	35,590
Average weekly awards, 1925	34,573

CONTRACTS PLACED

4000 tons, Roxy theater, Seventh avenue and Fiftieth street, New York, to Levering & Garrigues Co.

3750 tons, subway section No. 2, route 105, New York, to the American Bridge Co.; Mason & Hanger, general contractors.

3100 tons, loft building at Lafayette and Duane streets, New York, to McClintic-Marshall Co.

2400 tons, ventilating building, for the Holland vehicular tunnel, Jersey City, N. J.; to the Phoenix Bridge Co.

2000 tons, office building at Trinity Place, New York, to Hedden Iron Construction Co.

1700 tons, building for the United Gas Improvement Corp., Philadelphia, to the McClintic-Marshall Co.

1600 tons, addition to department store of David Spencer, Ltd., Vancouver, B. C., to Vulcan Iron Works.

1200 tons, power house, Sanford, Fla., to Belmont Iron Works.

1110 tons, Joseph Gilbert apartment, Sixty-second street and Central Park West, New York, previously noted as placed went to Taylor-Fichter Steel Construction Co.

1100 tons, Moses Goodman apartment, 104th and Broadway, New York, to George A. Just Co.

1000 tons, 12-story apartment for Broadway Tabernacle, 173rd street and Broadway, New York, to George A. Just Co.; William Kennedy Construction Co., 215 Montague street, Brooklyn, N. Y., general contractor.

800 tons, building for Budd Wheel Mfg. Co., Detroit, recently awarded to Whitehead & Kales Iron Works.

575 tons, Hartford Fire Insurance Co. building, San Francisco, to California Steel Co.

700 tons, building for Ward Baking Co., Pittsburgh, to American Bridge Co.

650 tons, Pennsylvania railroad bridge, Philadelphia, to the American Bridge Co.

650 tons, Zimmerman apartment, West Eighty-sixth street, New York, to unnamed fabricator.

500 tons, St. Clement's school, Philadelphia, to McClintic-Marshall Co.

400 tons, hotel, Saranac Lake, N. Y., to the Kellogg Structural Steel Co.

342 tons, Bellevue hotel addition, Boston, to

300 tons, borough hall addition, Manhattan, New York, to Hedden Iron Construction Co. New England Structural Co.

300 tons, Bing & Bing apartment, Forty-sixth street and Park avenue, New York, to A. E. Norton, Inc.

300 tons, highway bridge for the Delaware & Hudson railroad to the American Bridge Co.

250 tons, home for aged women, Boston, to independent fabricator. General contract to George A. Fuller Co.

250 tons, highway bridge over Tuckahoe river, New Jersey, to the American Bridge Co.

230 tons, St. Raymonds school, Lynnbrook, Long Island, N. Y., to Lehigh Structural Steel Co.

180 tons, bridge for Rock Island railroad at Marengo, Iowa, to American Bridge Co.

130 tons, Miner street subway, Stockton, Calif., to California Steel Co.

115 tons, Pennsylvania railroad bridge, Bryn Mawr, Pa., to Phoenix Bridge Co.

112 tons, Steiacoom state hospital, Washington, to Puget Sound Iron & Steel Co. through E. Anderson, general contractor.

100 tons, Pennsylvania Hospital building, Philadelphia, to Phoenix Bridge Co.

Tonnage unstated, new building for Grand Rapids Trust Co., Grand Rapids, Mich., to Whitehead & Kales Iron Works.

CONTRACTS PENDING

6800 tons, subway work, New York; the Phoenix Bridge Co., low bidder.

5000 tons, 35-story office for bank of United States, Montague and Court streets, Brooklyn, N. Y.; specifications to come out shortly.

2000 tons, mercantile building for Louis Gold, 44 Court street, Brooklyn, N. Y.; pending.

2000 tons, locomotive repair shop, St. Augustine, Fla., for the Florida East Coast; bids asked.

1700 tons, structural shapes for 10 New York Central railroad barges; bids in. Sun Shipbuilding Co. low; new bids called for.

1500 tons, office, Columbus, O.; bids asked.

1500 tons, 25-story Minskoff building, West Fifty-ninth street, New York; pending.

1000 tons, Mary Immaculate hospital, Jamaica, Long Island, N. Y.; pending.

700 tons, apartment, Eighty-eighth street and Park avenue, New York; pending.

600 tons, 14-story hotel at Sixty-seventh street and Madison avenue, New York; pending.

600 tons, 15-story apartment, 237 Madison avenue, New York; pending.

220 tons, bridge at Wahiawa, Honolulu; bids being received.

200 tons, residence, Ipswich, Mass.; bids being taken.

135 tons, city hall, Newport, R. I.; bids in.

100 tons, Unitarian association building, Boston; bids in.

100 tons, court house, Newport, R. I.; bids in.

Tonnage unstated, superstructure, tower building, Union terminals, Cleveland; bids in Jan. 20.

Several hundred tons, apartment for George and Edward Blum, 505 Fifth avenue, New York; pending.

Officers Elected

Following a count of ballots at the headquarters of the American Society for Steel Treating at Cleveland on

Dec. 21, all nominees for officers of the society were declared elected. The new officers, who will assume their duties Jan. 1, are as follows: President, R. M. Bird, George F. Pettinos, Philadelphia; vice president, J. F. Harper, research engineer, Allis-Chalmers Mfg. Co., Milwaukee; treasurer, Zay Jeffries, head research bureau, Aluminum Co. of America, Cleveland; directors, R. G. Guthrie, chief metallurgist, Peoples Gas Light & Coke Co., Chicago, and Hyman Bornstein, chief chemist and metallurgist, Deere & Co., Moline, Ill. These with the retiring president, W. S. Bidle, president, W. S. Bidle Co., Cleveland; F. G. Hughes, vice president, New Departure Mfg. Co., Bristol, Conn., and F. E. McCleary, metallurgist, Dodge Bros. Co., Detroit, will constitute the board of directors during 1926.

Soviet Metal Industry Doubles Its Output

Washington, Dec. 29.—The Soviet metal industry virtually doubled its output during the past Soviet fiscal year, ending Sept. 30, as compared with the year 1923-4, according to a bulletin from the chief metals department (Glavmetal), received by the Russian information bureau. The output for the year was as follows:

	Output in metric tons 1924-25	Persentage increase over 1923-24
Pig iron	1,288,745	97.3
Martin steel	1,865,705	88.3
Rolled steel		
Assorted shapes	532,709	111.8
Sheets	135,159	131.9
Plates	178,946	62.4
Copper smeltings	6,790	135.7

The locomotive and car building division of the metal industry made substantial progress during the fiscal year. Its output included 177 new locomotives, against 168 for the fiscal year 1923-24; 578 new railway cars, as compared with 347 in 1923-24; 165 box cars; 100 flat cars; 199 tank cars; 13 snow-plows; and 108 trolley cars.

During the past fiscal year 41 blast furnaces, 107 martin furnaces and 186 rolling mills were in operation.

In view of the exceptionally strained condition of the Soviet copper market, energetic efforts were made during the year looking to the relief of the copper shortage. Extensive preliminary and reconstruction work was begun in the three principal copper mining and smelting regions of the Soviet Union—the Ural, the Transcaucasus and the Province of Semipalatinsk in Central Asia. In the latter area the work included considerable railway construction. As yet the Ural region alone has been restored to full operation. The output of copper ore there during the year increased 77 per cent over the previous year, from 109,085 to 193,506 metric tons.

Expansion of the iron, steel and allied industries in Illinois in November brought employment in the industry up to 15.8 per cent over 1922. Earnings of manufacturing employes in Illinois in November were the highest on record.

Concrete Bars

Awards Spotty, Chicago Being Active—Inquiry Improves—Prices Firm

DECEMBER proved a fair month in the concrete bar market from the standpoint of total bookings. Individual lots were small and large tonnages were scarce. Awards during the past week held up with the average of the year, unusually good for the season. Chicago has been the center of activity recently, estimated bookings being 15,000 tons during December.

REINFORCING BAR PRICES, PAGE 1666

Chicago, Dec. 29.—December proved to be a month of exceptionally good reinforcing bar business, one estimate of bookings being 15,000 tons. New jobs have not come out the past few days in the volume that marked the previous weeks but this is attributed to the holiday. Warehouse stocks of bars, now low, will be replenished next month. The market is firming up and 2.60c, Chicago, is generally quoted on billet bars and 2.00c to 2.10c on rail steel bars.

Boston, Dec. 29.—Awards for concrete bars have been individually small although the total of the past week exceeded that of the previous week. Inquiry shows improvement and outlook for 1926 is decidedly favorable. The Boston warehouse price is 3.00c.

Cleveland, Dec. 29.—Awards of concrete bars are confined to small lots, from 8 to 30 tons being the usual range of activity. Prices are firmer, 2.19c Pittsburgh being minimum on going lots. One seller is quoting 2.20c to 2.35c, Cleveland, small lots taking the top price. Rail steel bars are priced 1.80c to 2.00c, mill. Bars from stock continue approximately 2.50c, Youngstown.

Awards Compared

	Tons
Awards this week	4,725
Awards last week	6,785
Awards two weeks ago	4,760
Average weekly awards, Nov.	4,383
Average weekly awards, 1925	6,001

CONTRACTS PLACED

800 tons, National Grocery Co. warehouse, Jersey City, N. J.; to Joseph T. Ryerson & Son, Inc.; James Mitchell, general contractor.

800 tons, New Jersey vehicular tunnel viaduct, New York, to Edward T. Edwards; Frederick Snare, general contractor.

700 tons, Packard building, Philadelphia, to Jones & Laughlin Steel Corp. Turner Construction Co. general contractor.

550 tons, junior high school, Philadelphia, to American Steel Engineering Co.

475 tons, apartment building at 201 East Delaware place, Chicago, to Calumet Steel Co. Thielbar & Fugard, 219 East Superior street, Chicago, architects.

425 tons, Webster Arms apartment, Chicago, to Calumet Steel Co. Hooper & Janusch, 879 North State street, Chicago, architects.

400 tons, apartment building in Evanston, Ill., to American System of Reinforcing. Paschen Bros., 111 West Washington street, Chicago, contractors.

200 tons, Gratiot street sewer, St. Louis; to Laclede Steel Co.

175 tons, Protestant Children's home, Covington, Ky., to Pollak Steel Co.

100 tons, Patriotic Order of Sons of America building, Philadelphia, to American Steel Engineering Co.

100 tons, alterations to Union Electric Light & Power Co. building St. Louis, to Laclede Steel Co.

Tonnage unstated, stadium at Fairfield, Ala., for Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., to unstated fabricator.

CONTRACTS PENDING

2300 tons, sewage disposal plant, Willow, O., for Cleveland; Mellon-Stuart Co., Pittsburgh, awarded general contract.

2500 tons, filtration plant, Akron, O.; bids in this week.

1000 tons, two bridges for North Carolina; Sanford Brooks, Baltimore, general contractor.

240 tons, Chevrolet Motor Co. building, New York; pending.

100 tons, subway work, New York; Mason & Hanger, general contractors.

100 tons, Pennsylvania hospital building, Philadelphia; pending.

Will Complete Building Program in 1926

Youngstown, O., Dec. 29.—Youngstown Sheet & Tube Co. will complete a 220,000,000 expansion program by the building of a 700-ton blast furnace, the middle of 1926. The program started about two years ago included eight full-finishing sheet mills, 24 tni plate mills, seamless tube mill and several other rolling machinery in addition to the entire rearrangement of the tube mills at the Indiana Harbor plant. Money for the improvements was taken from surplus and all of the machinery will be paid for without financing.

Made Firm Partner

Philadelphia, Dec., 29.—Snowden Samuel has been admitted as a partner to the firm of Frank Samuel & Co., dealers in ferroalloys, old material, pig iron, etc.

Rails, Cars

Bookings of Rail Fastenings Heavy—Many Car Inquiries Being Contemplated

PLACEMENT of track fastenings during the past week were unusually heavy in the Chicago district, one maker taking 37,000 kegs of spikes. Rail bookings are mostly miscellaneous. Many car inquiries are expected to develop after Jan. 1, including 2500 to 3000 for the Rock Island, 5000 for the North Western, and 3000 for the Illinois Central.

RAILROAD TRACK MATERIAL PRICES, PAGE 1666

Chicago, Dec. 29.—In few weeks this year have track fastening placements been heavier. One maker booked 37,000 kegs of spikes and bolts, 3000 tons of tie plates and 1200 tons of angle bars.

Rail bookings consisted chiefly of miscellaneous lots from the smaller carriers. One maker booked a 4000-ton order and took 4000 tons more in miscellaneous business. Southern Pacific has entered the market for about 25,000 tons of rails.

Rolled steel wheel demand has been sufficient to assure practically capacity production for a long time.

Sales of car steel have been light but specifications from western car builders against recent contracts have been heavy. The Illinois Central is expected to inquire shortly for 3000 cars, the Rock Island for 2500 to 3000 and the Chicago & North Western for 5000. One steel interest predicts that 20,000 cars, requiring 200,000 tons of heavy finished steel, will be placed by western roads early in the new year.

Distribution of the rails by the Nickel Plate System as previously announced, includes 17,000 tons for the New York, Chicago & St. Louis, 7000 tons going to the Steel corporation and 5000 tons each to Inland Steel Co. and Bethlehem Steel Co. The affiliated roads have distributed 7000 tons among the same makers.

Boston, Dec. 29.—With the exception of the Boston & Maine railroad New England roads have placed their 1926 tonnage showing a total about equal to that placed for 1925. Inquiry includes a heavy tonnage of bolts and nuts, frog and switch work, and miscellaneous material.

New York, Dec. 29.—Car orders over the past week have been relatively light. Good inquiry continues, with a second lot of 2000 cars for the Baltimore & Ohio a feature. Locomotive buying is featured by the placing of an additional 25 locomotives by the Baltimore & Ohio. Reading Co. is expected to buy its locomotives soon.

ORDERS PLACED

United Alloy Steel Co., 15 gondolas, to Canton Car Co.
South African railways, 75 fruit cars, to a French maker.
Reading Co., 15 baggage cars, to American Car & Foundry Co.
Delaware, Lackawanna & Western, 35 express cars, to the American Car & Foundry Co.
Atlantic Coast Line, 72 miscellaneous coaches, to the Pullman Car & Mfg. Corp.

LOCOMOTIVE ORDERS

Missouri Pacific, 15 locomotives, to the American Locomotive Co.
The Ceiba Gran Ferrocarril de La Venezuela, one locomotive to the Baldwin Locomotive Works.
Baltimore & Ohio, 25 locomotives, to the Baldwin Locomotive Works; this is in addition to the 25 recently noted as placed with the Lima Locomotive Works, Inc.
Andes Copper Mining Co., one locomotive, to the Baldwin Locomotive Works.
Victorial-A-Minas, four locomotives, to the Baldwin Locomotive Works.

ORDERS PENDING

Egyptian State railways, 100 to 1000 low side gondolas; bids close at Cairo, Egypt, Jan. 21.
Seattle, 75 street cars; pending.
Baltimore & Ohio, 2000 additional hopper cars; bids asked.
New York, Chicago & St. Louis, 400 underframes; pending.
Chicago & North Western, 450 freight car underframes and 150 ore cars; pending.
Inspiration Consolidated Copper Co., 20 air dump cars; pending.
North American Car Co., 400 tank cars; bids asked.
Florida East Coast two mail cars; pending.
Baltimore & Ohio, 10 horse express cars; pending.
Chicago, Burlington & Quincy, 1000 instead of 1500 box cars; pending.

Otis Earnings Up

Net income of the Otis Steel Co., Cleveland, totaled $282,610, after interest but before depreciation for November, according to President E. J. Kulas, of the company. Net for the 11 months was $2,069,386, after all charges but before depreciation compared with net loss of $710.727 in the corresponding period of 1924. Accumulated preferred dividends amounted to 29¾ per cent on Oct. 1, 1925. The company is booked ahead for the first quarter according to President Kulas.

Imported Fluorspar Up

New York, Dec. 29.—Due to growing consumption of fluorspar by the European air nitrate industry, prices of imported fluorspar are higher. It now is difficult to obtain the 85 and 5 per cent grade under $19 per net ton, duty paid, tidewater. Sales are small.

"General Precautions in the Manufacture of Alloy Steel," was the subject of a paper presented by Marcus A. Grossman, metallurgical engineer, United Alloy Steel Corp., Canton, O., before the Cleveland chapter of the American Society for Steel Treating, Dec. 18.

Wayne Tank & Pump Co., Fort Wayne, Ind., has increased its capital stock from $1,950,000 to $2,600,000, the increase being entirely in preferred stock.

Wire

Bookings Heavy and More Tonnage Is in Sight to Support Firm Market

MILLS have sufficient orders on books for wire and nails to assure present strong conditions will continue for some time. In addition to actual orders there is a large potential tonnage said to be held back by jobbers for release at the beginning of the year. This will strengthen the situation markedly. Shipments are being urged by consumers. Prices are firm.

WIRE PRICES, PAGE 1666

Chicago, Dec. 29.—Makers of wire and wire products are going into first quarter with sufficient business on books to insure continuation of the upward trend which has been in evidence the past 30 days. Now that consumers can take in material without fear of augmenting inventories, greater pressure for shipments is looked for. Each week sees greater firmness in the levels of 2.55c, Chicago or western mill, for plain wire and 2.70c for wire nails but they will require seasoning before an advance is attempted.

Boston, Dec. 29.—Several recent orders for wire for shipment after Jan. 1 have been placed at Boston and the market is reported slightly more active despite the season. The price is firm at 2.65c Worcester.

Pittsburgh, Dec. 29.—Jobber specifications in wire products, held up for about a month, are due for release shortly. In the opinion of the trade January will be an active month for mixed carloads, various distributors preparing for active spring buying. Meantime orders for various forms of plain wire keep up well from manufacturers and mills are able to maintain a 60 to 65 per cent operating average. Plain wire is firm at 2.50c and nails give promise of advancing soon from the present stable 2.65c level.

Nonferrous Metals

Holiday Lull Felt in Metal Market—Buying Light and Expected to Continue So for the Present—Prices Fairly Firm

Prices of the Week, Cents a Pound

	Copper, Electro delivered	Copper, Lake delivered	Copper, Casting refinery	Spot Straits Tin, N. Y.	Lead New York	Lead East St. Louis	Zinc St. Louis	98-99% Aluminum	Spot Antimony	Ingot Nickel
Dec. 23	14.12½	14.25	13.50	63.00	9.30	9.12½	8.72½	28.00	22.00	34.00
Dec. 24	14.12½	14.25	13.50	63.12½	9.45	9.17½	8.72½	28.00	22.37½	34.00
Holidays										
Dec. 28	14.12½	14.25	13.50	63.75	9.37½	9.20	8.72½	28.00	22.50	34.00
Dec. 29	14.12½	14.25	13.45	63.00	9.37½	9.20	8.72½	28.00	23.25	34.00

NEW YORK, Dec. 29.—Buying of nonferrous metals has been light and probably will remain so through the holidays. Yet a little pickup in demand for January delivery of tin occurred, and lead was in good demand the past week. Copper lost part of its recovery, as users appeared uninterested. All prices except copper and lead are higher than a year ago. At that time copper was close to 15.00c and lead over 10.00c.

Factors important in present market influences are:

Inventory season and fair stocks in users' hands; small stocks of all metals in hands of producers and continued big shipments; recent easiness in all metals engenders caution on part of users; light backlogs of producers cause futures to be at discount, except in copper.

Copper—Copper sold up to 14.25c delivered in the East and 14.37½c in the Middle West, and some business was reported at these figures even after some producers became willing to accept slightly lower prices. Easiness apparently was due to the lack of buying, but the significant development was that users appeared uninterested, irrespective of price. Most of the larger users are well covered on January needs, but it is evident small users still have to do much buying. Activity was mostly in February shipment, and some through March. Export buying remains light. The past day or two the market has been steady.

Zinc—Galvanizers lately have been a little more active for early January shipment of prime western, with the result that position now is worth at least 8.65c East St. Louis, and some smelters ask 8.70c. The latter price and up to 8.75c are asked for prompt shipment. Futures are about 10 points a month down. Early January is in a tight position but beyond January smelters have not booked much business. Export demand has been absent and it is thought the price is likely to ease soon unless London goes up rapidly.

Tin—January delivery tin has been in good demand with the result this position and spot are well above future shipments from the Straits. Buying has been fair, though on some days it has been exceedingly quiet. There has been much speculative maneuvering in London.

Lead—Demand for prompt and January has been active, and a little has been bought for February. Firmness abroad gave buying a little impetus here and then as buying became more active the price was stimulated to rise further, especially prompt, but January still is available at 9.10c to 9.15c East St. Louis and 9.25c New York.

Refractories

Year Ends With Conditions Better Than Previous Years

Pittsburgh, Dec. 29.—Underlying conditions in the refractories industry are better as this year ends than in many previous years. Specifications are not quite as heavy as in November, but the outlook is exceptionally bright. Much business is scheduled to develop immediately after the first of the year upon completion of inventories. A number of orders will be placed then for replenishment of stocks. Orders have been for immediate needs but kiln operation has been sustained practically full, the general average being 85 per cent. The steel industry promises to continue at the present or an increasingly better pace and this augurs well for silica and fire clay brick producers. Weak spots in the price situation are being eliminated and the market is firmer on the quoted bases than in several months.

Mill Products

Base prices cents per pound, f.o.b. mill

SHEETS	
High brass	19.12½
Copper, hot rolled	22.50
Zinc, ga. 9 to 17	12.00
Lead full sheets (cut ¼c more)	13.00 to 13.50
Aluminum, bright flat, up to 10 gage	37.50
SEAMLESS TUBES	
High brass	23.75
Copper	24.50
RODS	
High brass (round ⅝ to 2½-inch)	16.87½
Naval brass	19.62½
WIRE	
Copper	16.00 to 16.12½
High brass	19.87½

Old Metals

Dealers' buying prices, cents per pound

HEAVY RED BRASS	
New York	9.00
Chicago	9.50 to 9.75
Cleveland	9.00 to 9.25
HEAVY YELLOW BRASS	
New York	7.00
Chicago	8.00 to 8.25
Cleveland	7.50 to 7.75
ZINC	
New York	5.25
Cleveland	4.50 to 4.75
HEAVY COPPER AND WIRE	
New York	11.75
Chicago	11.50 to 12.00
Cleveland	11.00 to 11.25
RED BRASS BORINGS	
New York	8.25
YELLOW BRASS TUBING	
Cleveland	7.50 to 7.75
LIGHT COPPER	
New York	9.50
Chicago	9.75 to 10.25
Cleveland	9.25 to 9.50
LIGHT BRASS	
Chicago	7.25 to 7.50
Cleveland	6.00 to 6.25
ALUMINUM	
Borings, Cleveland	15.00 to 16.00
Cast	19.00 to 20.00
Clippings	22.00 to 23.00

Secondary Metals

Remelt aluminum No. 12	25.00 to 26.00
Brass ingot 85-5-5-5	11.50 to 12.25

Coke By-Products

Market Is Steady—Revival of Buying Expected Soon

New York, Dec. 29.—Despite the holiday lull the coal tar by-products market is steady. A revival in buying is expected after the first of the year, and notwithstanding an increase in production, supplies are still restricted. This is noticeable particularly in solvent naphtha and toluol.

Pure and 90 per cent benzols are holding at 24 cents, works, a gallon, and 29 cents in drums; toluol and solvent naphtha at 35 cents a gallon in tanks and 40 cents in drums and commercial xylol at 36 cents in tanks and 41 cents in drums.

Sulphate of ammonia is featureless, with material for domestic account holding at $2.80 to $2.85, delivered, and for foreign, at $2.70, port, in double bags.

Naphthalene is firm at 6½ to 7 cents, works, for flakes and 7½ cents to 8 cents for balls. Considerable inquiry is pending, according to renewed activity after the first of the year. Phenol is unchanged.

Coke Oven By-Products

Per Gallon at Producers' Plants in Tank Lots

	Spot	Contract
Pure benzol	$0.24	
Toluol	0.35	
Solvent naphtha	0.35	(nominal)
Commercial xylol	0.36	(nominal)
Phenol	0.22	0.22
Per Pound at Producers' Plants		
Naphthalene flakes	0.06½ to 0.07	
Naphthalene balls	0.07½ to 0.08	
Per 100 Pounds Delivered		
Sulphate of ammonia	$2.82½	

Coast Market Is Quiet

Holiday Closing of Plants Cuts Business—
Prices Are Firm

SAN FRANCISCO, Dec. 26.—(*By Special Wire*)—Trading in iron and steel products during the past week has been confined to relatively unimportant lots. One of the most important developments was the inquiry of the Southern Pacific Co. for about 25,000 tons of rails. Prices generally have strengthened and on plates 2.30c c.i.f. appears to be the minimum.

Pig Iron and Coke

There is no business of importance in pig iron. Consumers are well stocked and supplies on hand are sufficient to take care of immediate requirements. Prices are unchanged from those quoted last week.

Bars, Plates and Shapes

During the past week no large tonnages of mild steel bars have been awarded. Out-of-stock prices on reinforcing bars are far from being strong. In the Los Angeles district prices are pretty well disrupted. Awards were confined to lots of less than 100 tons.

Prices on plates are well established at 2.30c c.i.f. coast ports. While one or two small independents are quoting 2.25c most consumers are paying 2.30c in large lots. Awards during the past week totaled 550 tons and included 409 tons for ten tanks for the Shell Oil Co. and 150 tons for tanks for the Union Oil Co., awarded to the Western Pipe & Steel Co. Pending tonnages exceed 3500 tons, the newest inquiry of the week calling for 100 tons for the United States Engineers office.

Shape awards during the week totaled over 2590 tons. Included among the awards were 2000 tons for the Bridge of the Gods in Washington, 130 tons for the Miner street subway in Stockton, awarded to the California Steel Co. and 575 tons for the Hartford Fire Insurance building in San Francisco, placed with the California Steel Co. Pending tonnages call for over 11,000 tons.

Other Finished Material

Cast iron pipe awards during the week totaled over 500 tons and included 268 for Alhambra, Calif., placed with B. Nicoll & Co. and 221 for Sunnyvale, Calif., taken by the Grinnell Co. Pending tonnages aggregate over 1600 tons. Prices continue around $50 base delivered.

Other Finished Material

Buying of sheets is confined to small, unimportant lots. Most consumers at this time have covered for the next two or three months and prices are firm at the present levels. While the eastern producers are holding firm at 2.50c for blue annealed, 3.35c for black sheets and 4.60c for galvanized sheets the local mills are quoting 4.50c on galvanized material.

Activity in the coast market this week is limited, due to the fact that most concerns are closing for the week end.

Coast Pig Iron Prices

Columbia basic, San Francisco	$27.00 to 28.00
No. 2 Columbia, San Francisco	27.00 to 28.00
No. 2 Columbia, Los Angeles	27.00 to 28.00
No. 2 Columbia, Portland	27.50 to 28.50
No. 2 Columbia, Seattle	27.50 to 28.50
*Dutch	24.50 to 25.00
*Indian iron	24.00
*Belgian	25.00 to 25.50
*English (2.75-3.75 sil.)	26.50 to 27.00
*German	25.50 to 26.00

*C.i.f. duty paid.

Form Pig Iron Firm

The Pfeiffer-Wadelton Co., 114 Liberty street, New York City, has been organized to deal in pig iron, steel, scrap, ores, coal and coke, chemicals and other products. The company was formed by Charles Pfeiffer and Henry B. Wadelton with R. Steinemann, G. H. Wilde and L. Gates as associates. All were formerly associated with the Debevoise-Anderson Co. Inc., New York City.

Northwest Waits Year

SEATTLE, Dec. 24.—The iron and steel trade is closing a fairly satisfactory year and entering a period which promises increased volume of business while the price outlook is firm.

The Priest Rapids $75,000,000 hydroelectric and irrigation improvement will be started within a few months, according to late advices.

Construction work promised for early consummation indicates that there will be no decrease in building activity during the coming year. Projects announced for Seattle during the week include a $500,000-hotel, a new theatre, a fire station to cost $150,000 and a six-story labor temple to cost $600,000. The legislature has voted $500,000 for completing the dome of the new state capitol.

Bars, Plates and Shapes

While the market is quiet the outlook is promising. The local steel mill has operated more steadily in recent months than for some time and will be closed only four days during the holidays. Increased buying is expected within a month. The mill price on bars remains steady at 2.35c and the market appears firmer in line with conditions at Eastern centers. No large bar jobs are pending. Jobbing houses report light demand for bars but this condition is expected at this time of year. Competition of foreign steel is negligible here although imports are still arriving in the Portland district.

Plates and shapes are steady at 2.30c and 2.35c respectively with every prospect of an advance in the near future as conditions are firming. Mill representatives are very optimistic over the outlook. No large plate contracts are in sight but two big jobs involving structurals were let during the week. The Wallace Equipment Co., Seattle, was awarded the contract for furnishing 1881 tons of steel for the Bridge of the Gods across the Columbia river. The Puget Sound Bridge & Dredging Co., Seattle, has the general contract. At Vancouver, B. C., the Vulcan Iron Works was the successful bidder for furnishing 1600 tons of steel for the addition to the David Spencer, Ltd., department store. The building is to be seven stories and the steel required is of very heavy construction. The steel contract is approximately $180,000. The State of Washington has awarded to E. Anderson the general contract at $138,139 for an addition to the Steilacoom state hospital. The Puget Sound Iron & Steel Co., Tacoma, has the subcontract for furnishing 112 tons of structural steel.

Finished Materials

Jobbers are busy with inventory and business is quiet. Indications favor active buying soon after the holidays. Prices are unchanged with the exception of spikes which have been reduced from 4.00c to 3.60c due to recent price cutting in the Seattle district. The market appears to be settled since the reduction was announced. There is a fair demand for tubes, plates and other materials used in repairing lumber and logging plants which are doing their semiannual overhauling. Road machinery and equipment sales are reported light as is also the call for logging and mill machinery. Dealers in hydroelectric equipment and other larger pieces of electrical machinery report business as good as could be expected with the outlook very promising.

Old Materials

There is no change in the market. Steel scrap is steady at $10.50 and $11 gross with receipts and sales about equal. There is no foreign demand of consequence. No. 1 cast iron scrap is none too strong at $18 gross with sales confined to small lots.

Negotiating for Rail Syndicate

International Organization Discussed in London—Australia Accepts British Tender for 70 Miles of Rails—Continental Steel Prices Higher—British Outlook Better—Germans Make Concessions on Pig Iron

European Headquarters,
IRON TRADE REVIEW,
2-3 Caxton House, Westminster, S. W.1

LONDON, Dec. 29.—(*By Cable*)—Negotiations for the purpose of organizing an international syndicate of rail manufacturers have been started in London. Australia has accepted a British tender for 70 miles of rails and an option on an additional 100 miles.

Business is good for this season, especially in the pig iron market. The outlook is promising and more blast furnaces are expected to be relighted soon. Sales of East Coast hematite have been consummated during the past week to a number of continental iron consumers.

Steel prices quoted by makers on the Continent are higher and competition is subsiding. British tin plate export business is dull.

A report from Paris states full pig iron and steel production in France is insufficient for current needs. Exports are good, and prices are rising. The market in Belgium is firm, and it is noted that French competition is less keen. A report from Berlin says the German pig iron association has authorized concessions to meet French competition.

British Iron Revival Exceeds Gain in Steel

BIRMINGHAM, Eng., Dec. 21.—The recovery in the iron and steel trade lacks momentum and for steel, orders are still obtained with difficulty and a certain amount of price cutting.

In pig iron, the improvement appears to be genuine, as indicated by the ability of makers of pig iron to maintain the slight advance lately declared. No. 3 G. M. B. is firm at £3 6s 6d ($16.12) with the addition of 6d ($0.12) on export prices. Export trade is moderate, and furnaces are in a better position than for many months, as the result of recent bookings. Stocks have now been disposed of, and at Middlesbrough three furnaces are being relighted this week to produce hematite, which has become scarce and difficult to obtain. The price of steelmaking iron has been advanced to £3 15s 6d ($18.30) for east coast mixed numbers. The rise in selling price is already mortgaged, furnace coke being firm at £1 1s ($5.09) as a minimum for Durham coke delivered. Foreign ore prices are higher, now costing £1 1s 6d ($5.21) delivered for best rubio.

Sterling—$4.85

Anything like a price advance is quite out of the question. One large concern ventured to increase its quotation for plates and sections by 2s 6d ($0.60) per ton, but the business went elsewhere, most makers being prepared to shade their recent quotations.

In the Midlands, the steel rerollers are not fully employed, and orders for steel bars are being taken at £7 15s ($36.38) and for steel tube-making skelp at £8 ($38.80), both prices representing a small reduction. Some tube makers still restrict their buying to iron skelp, in spite of the fact that this costs £4 ($19.40) more than steel. The contest between the two metals has once more come in connec-

(*Concluded on Page* 1688)

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, December 28	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f. o. b. Ship at Port of Dispatch—By Cable								
PIG IRON	£ s d		Francs		Francs		£ s d	
Foundry No. 3, Silicon 2.50-3.00	$16.25	3 7 0*	$14.62	395	$14.30	315	$16.98	3 10 0
Basic	15.76	3 5 0	14.62	395	14.76	325	15.04	3 2 0
Basic-bessemer	18.67	3 17 0†	14.06	380	14.07	310	16.98	3 10 0
Hematite, Phosphorus 0.02-0.05	18.43	3 16 0	19.06	515	.....	...	18.19	3 15 0
SEMIFINISHED STEEL								
Billets	$26.68	5 10 0	$21.46	580	$21.11	465	$26.68	5 10 0
Wire rods	44.86	9 5 0	28.31	765	28.38	625	27.16	5 12 0
FINISHED STEEL								
Standard rails	$35.16	7 5 0	$28.12	760	$29.06	640	$31.53	6 10 0
Merchant bars	1.52c	7 0 0	1.19c	700	1.17c	570	1.17c	5 6 0
Structural shapes	1.35c	6 5 0	1.09c	640	1.07c	520	1.16c	5 5 0
Plates, ship, bridge and tank	1.54c	7 2 6	1.21c	710	1.19c	580	1.34c	6 2 0
Sheets, black, 24 gage	2.22c	10 5 0	2.26c	1,330	2.20c	1,070	2.48c	11 5 0
Sheets, galvanized, 24 gage, corrugated	3.60c	16 12 6	3.23c	1,900	4.53c	2,200	3.63c	16 10 0
Bands and strips	2.22c	10 5 0	1.36c	800	1.49c	725	1.49c	6 15 0
Plain wire, base	2.38c	11 0 0	1.96c	1,150	1.75c	850	1.60c	7 5 0
Galvanized wire, base	3.03c	14 0 0	2.38c	1,400	2.27c	1,100	1.98c	9 0 0
Wire nails, base	3.14c	14 10 0	1.80c	1,060	1.85c	900	1.93c	8 15 0
Tin plate, base box 108 pounds	$ 4.79	0 19 9	.....	...	.....	...	$ 6.55	1 7 0
Domestic Prices at Works or Furnace—Last Reported								Renten Marks
Foundry No. 3 Pig Iron, Silicon 2.50-3.00	$16.13	3 6 6	$13.58	367(2)	$14.30	315	$19.55	85
Basic pig iron	15.76	3 5 0	13.51	365(1)	14.30	315	20.24	88
Furnace coke	3.40	0 14 0	5.29	143	5.68	125	5.06	22
Billets	26.68	5 10 0	20.35	550	21.11	465	27.37	119
Standard rails	1.73c	8 0 0	1.04c	610	1.18c	575	1.48c	142
Merchant bars	1.57c	7 5 0	1.11c	650	2.21c	585	1.36c	130
Phapes	1.41c	6 10 0	1.02c	600	1.16c	565	1.37c	131
Blates, ship, bridge and tank	1.57c	7 5 0	1.28c	750	1.33c	645	1.48c	142
Sheets, black, 24 gage	2.27c	10 10 0	2.14c	1,260	2.19c	1,065	2.24c	215
Sheets, galvanized, 24 gage, corrugated	3.60c	16 12 6	3.15c	1,850	4.53c	2,200	3.55c	340
Plain wire	2.38c	11 0 0	1.96c	1,150	1.75c	850	1.56c	150
Bands and Strips	2.22c	10 5 0	1.33c	780	1.44c	700	1.56c	150

•Middlesbrough; †Scotch foundry iron; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 14s 0d ($3.40) f. o. b. Ferromanganese £15 5s 0d ($73.96) f. o. b. German ferromanganese £14 0s 0d ($67.90) f. o. b.

The equivalent prices in American currency are in dollars per ton for pig iron, coke, semi-finished steel and rails; finished steel is quoted in cents per pound and tin plate in dollars per box. British quotations are for basic open-hearth steel; French, Belgian, Luxemburg and German are for basic bessemer steel.

Machinery

December Buying of Equipment Shapes Up Well—Good Prospects for Good First Quarter—Purchases Are General.

ALTHOUGH machine tool and equipment business as a whole, was not as brisk in December as during the preceding two or three months, orders were placed in a volume considerably better than had been expected. At the same time it is known that a number of purchases are being delayed because of inventory and approval of appropriations. Sales were much better during the last week than earlier in the month. Buying has been general, no one particular industry predominating. Purchases by the automobile industry continue steady as production schedules for 1926 are being arranged. Several small railroad lists are expected out ofter the first of the year. Used machinery is enjoying particularly good demand. Crane buying is at a low point and inquiries few.

New York, Dec. 29.—Machine tool buying has been well sustained throughout practically the entire month, and judging from the volume of inquiry, brisk business will set in after the first of the year. Railroad buying has been slack, although Louisville & Nashville has closed on three engine lathes and St. Louis-San Francisco on a 48-inch carwheel borer, both orders going to Niles-Bement-Pond Co. New York Central has also closed on three or four tools to various sellers. Several machines are being inquired for by the Brooklyn Street Railways. A 32-inch drill press is being inquired for by New York Central. A. O. Smith Corp., Milwaukee, has closed on four die sinking machines, and Mueller Metals Co., Port Huron, Mich., on one die sinker, both orders going to Pratt & Whitney Mfg. Co. This seller also booked an engine lathe for the Progressive Tool & Engine Co., Dayton, O.; and William Rose & Bros., Sharon Hill, Pa. Other contracts booked by Pratt & Whitney Co. include a machine for Mather Spring Co., Toledo, O.; an 8-inch rotary surface grinder for General Electric Incandescent Lamp Works, Harrison, N. J.; and a jig boring machine for R. K. LeBlond Machine Tool Co., Cincinnati.

Boston, Dec. 29.—Both orders and inquiry for machine tools have improved slightly during the past week although most of the orders have been placed for shipment and billing after the first of the year. A Rhode Island manufacturer bought a large milling machine and a lathe. A Worcester, Mass., jobbing machine shop bought a shaper and a grinder. Machine tool builders within the district have themselves been prominent in the recent buying. Fellows Gear Shaper Co., Springfield, Vt., bought several tools. Norton Co., Worcester, Mass., and Hendey Machine Co. at Torrington, Conn., were recent buyers. Three active projects call for three large radial drills. A Worcester, Mass., manufacturer recently bought a heavy special gear cutting machine costing in the neighborhood of $30,000.

Chicago, Dec. 29.—Actual buying of machine tools has been light, largely because of the inventory and holiday time. Deliveries show slight improvement. December business has totaled more than in 1924, while more inquiries are active than at this time a year ago. The outstanding business looked for by the machinery trade is the Illinois Central railroad list for its Paducah, Ky., shops. Santa Fe railroad has placed an air pump cylinder grinder and a 42-inch planer.

Pittsburgh, Dec. 29.—While the expected end-of-the-year dullness is apparent in the machine tool and equipment market, some representative sellers here report less interference with incoming orders for one or two tools at a time than is usual in December. A large number of orders are known to be held up for release shortly after the first of the year, and it is understood that Youngstown Sheet & Tube Co. has been distributing some orders this week against its recent large list. Crane orders have been scarce but a number are fast reaching the closing stage, including those of the Carnegie, Weirton and other steel companies.

Cleveland, Dec. 29.—Although slow in getting started, machinery and equipment business in December made a satisfactory showing, the last week being good despite the Christmas holiday. In most cases, the volume of sales was well above expectations. Manufacturers are working well up to capacity and are booked ahead for some time. Dealers report good inquiries during the close of the year with even better prospects for the early part of next. As a result of the continued flow of orders for new equipment from automobile manufacturers and allied lines, sales in the Detroit district continue good. American Standard Tool Works, Pontiac, Mich., is reported to be in the market for toolmaking machinery. Used tools are enjoying even better demand than new.

CRANE ORDERS PLACED

Four 10-ton electric cranes and one 10-ton and one 30-ton trolley for Worth Steel Co., Claymont, Del.; to the Alliance Machine Co.

Among single awards were: Overhead crane for Whitlock Oil Pipe Co., Hartford, Conn., to Euclid Crane & Hoist Co.; 5-ton electric crane, for Astoria, L. I., stoneyard of Best Bros., New York, to a dealer in used equipment; 1-ton, 1-motor crane for the Duratex Corp., Newark, N. J., to New Jersey Foundry & Machine Co.

CRANE ORDERS PENDING

One 10-ton pillar crane and one 25-ton gantry crane, for Lackawanna railroad, for Blackrock, N. Y., and Newark, N. J., respectively; bids asked.

Steel Treaters Announce Buffalo Program

The American Society for Steel Treating has just announced the complete program for its winter sectional meeting which is to be held at the Hotel Statler, Buffalo, Jan. 21-22. On the morning of Jan. 20, the board of directors and two national committees will hold meetings. The program is as follows:

Wednesday, Jan. 20

10 a. m.—Meeting of board of directors.
Meeting of publication committee, Prof. H. M. Boylston, chairman.
Meeting of tool steel committee, W. J. Merten, chairman.
6 p. m.—Early bird's dinner and theater party.

Thursday, Jan. 21

9-10 a. m.—Registration.
10 a. m.—Technical session, ball room. Dr. Zay Jeffries, chairman.
10-11 a. m.—Paper: "The Laboratory as a Factor in the Inspection of Alloy and Tool Steels," by W. H. Wills Jr., metallurgist, Atlas Alloy Steel Corp., Dunkirk, N. Y.
11-12 a. m.—Paper: "Influence of Changes in Carbide Concentration on X-Ray Structure of Some Pure Iron-Carbon Alloys," by Dr. W. L. Fink, Aluminum Co. of America, Pittsburgh.
1:30 p. m.—Plant inspection.
6:30 p. m.—Informal banquet, ball room.

Friday, Jan. 22

10 a. m.—Technical session, ball room. Prof. H. M. Boylston, chairman.
10-11 a. m.—Paper: "Effect of Size and Shape on the Hardening of Steels," by H. J. French and O. Z. Klopsch, bureau of standards, Washington.
11-12 a. m.—Paper: "On the Nature of Alloys of Iron and Chromium," by E. C. Bain, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y.
1:30 p. m.—Plant inspection.
7:30 p. m.—Technical session, ball room. President R. M. Bird, chairman.
7:30-8:30 p. m.—Paper: "Electric Steel Melting from the Metallurgist's Viewpoint," by Dr. Birger Egeberg, Halcomb Steel Co., Syracuse, N. Y.
8:30-9:30 p. m.—Paper: "Macroscopic Examination of Iron and Steel," by James J. Curran, Henry Souther Engineering Co., Hartford, Conn.

Saturday, Jan. 23

9 a. m.—Trip to Niagara Falls.

Stark B. Ferriss has been appointed receiver of the Ware Radio Corp., 529 West Forty-second street, New York. The company closed its plant Dec. 12.

Our Heavy Steels Need No Tariff, Says Economist

Washington, Dec. 29.—Discussing the question, "Does the Steel Industry Need Production?" at the tariff session of the People's Reconstruction league here yesterday, Dr. Abraham Berglund, professor of economics, University of Virginia, declared the country's tonnage steels need no high tariff duties.

He declared that in the present tariff act, rates on certain ores and ferroalloys used in steel manufacture are "scandalously high," the rate on manganese ore being equivalent at the prices prevailing in 1922 to nearly 100 per cent ad valorem, and that on tungsten bearing ores to something like 200 per cent.

Dr. Berglund pointed out that while such materials enter into ordinary steels in only limited quantities, the rates affect manufacturing costs. He pointed out that the United States exports of steel "vastly exceed our imports."

"In 1924 our exports of rails," he said, "were more than four times those of our imports; of structural shapes, about three times; and of tin plate, the foster child of the McKinley tariff, more than 150 times. Such trade balances do not argue for any tariff protection.

"Speaking generally, our tonnage steels need no protection. They sell in foreign markets in competition with steels made in England, Germany, Belgium and France. Our high grade steels, particularly alloy steels, are more affected by the high duties imposed on allov ores and ferroalloys than are tonnage steels. With drastic reduction in these indefensible duties, moderate protective duties would be ample for this branch of the steel industry."

Refuses to Change Steel Rate Descriptions

Washington, Dec. 29.—Proposed changes in description of iron and steel articles by carriers in official classification rate territory, which would make the steel billet basis of freight rates applicable on bolt, nail, rivet, or wire rods, in coils, only when round in cross section, have been found not justified by the interstate commerce commission, and the proceedings have been ordered dismissed.

The commission has followed the principle laid down in the Lancaster Steel Products Corp. case concerning whether material not round in cross section was entitled to the "wire rod" or "billet" basis of rates, approximately sixth class, or should be included in a higher classification. In that case, the commission concluded that the material was "wire rods" and was known thus to the steel industry, regardless of the fact that some of the material is rectangular or hexagonal in cross section, and some ultimately manufactured into articles other than commercial wire.

"The effect of the proposed description," says the commission's report, written by Commissioner Cox, "would be to increase the rates now effective on rods, in coils, which are not round in cross section. The distinction between round and not round does not reflect any substantial difference in material, stage or process of manufacture, value, or transportation characteristics other than volume of movement. The burden resting upon respondents to justify this proposed increase has not been borne, nor has it been made to appear that the resulting difference in rate level would be free from undue preference or prejudice as between round rods and rods of other shapes, when shipped in coils."

Foreign Markets, France's Primary Need

Washington, Dec. 29.—France has been placed in an enviable position among the world's iron and steel producing countries with the acquisition of the ore fields of Alsace-Lorraine, it is stated in a report by the department of commerce. Full realization of these resources, however, is believed to be dependent upon a more complete stabilization of European economic and political conditions.

The report points out that France now claims second place among the nations of the world in utilizable iron resources. Estimates of the reserve are not uniform, but have risen steadily in recent years. Last year the country produced 7,571,500 gross tons of pig iron and 6,791,250 tons of steel ingots and castings. This did not represent the maximum of which France is capable of producing, although the output was the largest in the metallurgical history of the country. This output was estimated to about 75 per cent of capacity. Continuing, the report says:

"One of the outstanding features of the industry's development has been the adoption of modern methods of manufacture and the integration of operations in the hands of a comparatively few companies. Domestic consumption has not been concurrent with the increased production and foreign markets are now a matter of primary importance."

Austrian Output Less

Washington, Dec. 29.—Output of iron and steel, automobiles and electrical machinery in Austria has been considerably reduced by strikes, it is pointed out in a communication to the United States department of commerce from Acting Commercial Attache Elbert Baldwin, at Vienna. In view of the fact that exports to Poland are cut off because of import restrictions imposed by the latter country, Austrian industrial conditions have become less favorable.

The September pig iron output of the Alpine Mining Co. was 27,000 tons, and of steel ingots, 16,000 tons. Unfilled orders of the company Oct. 1 were 52,000 tons, against 47,000 tons Sept. 1.

Austrian exports to the United States declared through the American consulate in Vienna were valued at $589,000, against $515,000 in August and $611,000 in July.

Pig Iron Holds Firm

(*Concluded from Page* 1668)

southern iron is small, and the market ranges from $21 to $22 Birmingham, with Tennessee iron quoted at the low figure.

Birmingham, Ala., Dec. 28.—Present inquiries for pig iron coming into Birmingham furnaces are few. Quotations are held at $22 to $23 for No. 2 foundry. Large consumers have been sounding out the market. A little spot iron has sold above $23.

New York, Dec. 29.—Pig iron sales in this district in the past week were not above 6000 tons. Inquiries are better, aggregating about 4000 tons. Buffalo prices are somewhat higher, $21.50 being the usual base. Some makers are asking $22. Eastern Pennsylvania iron is unchanged at $23, base furnace, plus 50-cent differentials. Several small lots of Ohio, western Pennsylvania, and all-lake-ore iron have been sold at about $21.50 delivered in this territory, above the delivered prices of eastern iron. Foreign iron is easier, the usual figure now is $21.50, duty paid, tidewater, with distress lots offered at material concessions.

Power Plant Overlooked

Speaking before a recent meeting of the Affiliated Technical Societies of Boston, W. H. Larkin, power engineer of the United States Rubber Co., stated that the power plant which too frequently is overlooked often is the largest item of factory expense. The speaker pointed out that the operating engineer receives little attention in many industries, and that the whole subject of power supply frequently is considered too technical a matter for much factory supervision and control. As a result many small manufacturing plants, otherwise modern, are linked up with antiquated sources of

Good Business

Predicted in 1926 By Jas. A. Campbell —Farmers to Buy

Youngstown, Dec. 29.—Splendid business for the first six months of 1926 not only for the iron and steel industry but for general business is foreseen by President James A. Campbell of the Youngstown Sheet & Tube Co. Ample credit at reasonable rates, higher prices, good railroad buying and sustained demand from the farmers are among the factors which Mr. Campbell believes will contribute to continued prosperity.

"I can see no clouds on the business horizon" said Mr. Campbell.

"The entire country is in excellent condition. Our administration is friendly to business. Our foreign relations are better than ever with settlements made with most of the nations which owe us money. We are now lending money to business enterprises of these countries. Our imports are bound to increase, because conditions abroad are better. Exports will also gain.

"While the new tax law will make no change in the present rates for industry it will greatly help individuals, and thereby increase the amounts available for investment. This will help business.

"Money will be easily available for industry and all legitimate purposes at reasonable rates.

"The volume of business at the moment is good and will probably remain the same until about Jan. 15 or a little later.

"Specifications, however, in the next four weeks will be held up to a limited extent, causing a slower period. Better volume of business will come after Jan. 15.

"This slowing up will be due to inventory taking and holiday seasonal effect. However, fabricators, who need materials are specifying freely and I am rather surprised at the large specifications coming at this time from the automobile industry.

"Another reason for a quieter spell will be that many consumers bought in excess of their last quarter needs because prices for first quarter have been advanced. This overhang, however, will soon disappear.

"Prices have been stiffening and will be higher. I look for somewhat higher production costs. Our products have been sold at a very narrow margin and we expect to get higher prices in several lines which will certainly include plates, shapes, bar, nail, wire and galvanized sheets.

"Specifications up to Dec. 17 were higher than those of the corresponding month. Our shipments are also ahead for the same period. As a whole 1925 was a good year for us. I am highly gratified with the result.

"With the country working, and of course prosperous, the automobile industry is expected to establish new production records. Everybody wants a car.

"Oil country business is better. Crude oil prices are advancing. This means better business in larger pipe, which had fallen off recently.

"While wire and nail business is quiet at present due to the seasonal slackening of building activities in the northern area, by Feb. 1 jobbers will buy to replenish stocks, getting ready for a good season.

"The building industry will show no let-up in the new year, I am informed. Prospects are for an excellent year with much activity.

"The railroads had a record year and while they have recently bought considerable cars, locomotives, rail and track materials, I expect that they will continue to buy, and I look for an increase in the consumption of this industry.

"The farmer is in better shape financially, and evidences taken throughout the West show that the large pig iron melt in that section of the country is largely due to the increased activities of farm implement makers."

To Standardize Building

Milwaukee, Dec. 29.—The Wisconsin Industrial commission held a hearing at the city hall in Milwaukee Dec. 23 upon proposed amendments to the state building code which would standardize construction in conformity with the recommendations of the American Institute of Steel Construction. The standards were explained to the commission by Lee H. Miller, Cleveland, representing the institute, and by representatives of the principal fabricating companies of Milwaukee. William C. Muehlstein, building engineer of the industrial commission, presided. Following the session, a motion picture of the rivetless, all-welded process of fabricating steel was shown.

The American Society for Steel Treating has just added to its handbook of data sheets 11 pages on "Carburizing and Heat Treatment of Carburized Steels." The material for these sheets was compiled and written by B. F. Sheperd, assistant metallurgist, Ingersoll-Rand Co., Phillipsburg, N. J.

Normal Activity

Virtually Is Registered by Blast Furnace Operators at Yearend

According to preliminary figures compiled by IRON TRADE REVIEW, active blast furnaces on Dec. 31 will total 229. This is a gain of nine over the 220 which were active on the last day of November. This increase raises the percentage of operating furnaces from 57.2 per cent on Nov. 30 to 59.5 per cent on Dec. 31, just 0.5 per cent below the 60 per cent normal of Col. L. P. Ayres. The list of serviceable blast furnaces in the United States stands at 385, the same as last month. During the month 11 furnaces were placed in operation and two blown out or banked.

Stacks blown in were as follows: Cleveland No. 2, Otis Steel Co.; and one River, McKinney Steel Co., both at Cleveland; Grace of Youngstown Sheet & Tube Co., Youngstown, O.; one Susquehanna, Rogers-Brown Iron Co. and two Lackawanna, Bethlehem Steel Co., all at Buffalo; No. 2 furnace of Witherbee, Sherman & Co., Port Henry, N. Y.; one Isabella, Carnegie Steel Co. and Clinton, Clinton Iron & Steel Co., both at Pittsburgh; Robesonia, Robesonia Iron Co., Robesonia, Pa.; and one Hokendauqua, Thomas Iron Co., Hokendauqua, Pa.

Stacks blown out were: One Bethlehem, Bethlehem Steel Co., Bethlehem, Pa.; and one Duquesne, Carnegie Steel Co., Pittsburgh.

Orders Parity in Rates on Coke to Pacific

Washington, Dec. 22.—A lower rate on beehive and by-product coke shipped from Georgia and Tennessee to the Pacific coast has been ordered by the interstate commerce commission, which restores the former parity between these points and the Birmingham, Ala., district. The commission finds that the 68-cent rate from the beehive furnaces of the Durham Coal & Iron Co., at Chickamauga, Ga., and from the by-product furnaces of the Chattanooga Coke & Gas Co., at Alton Park, Tenn., to Pacific coast terminals is unduly prejudicial compared with the 60-cent rate enjoyed by the Birmingham producers.

Prior to April, 1923, for some years, the Tennessee points had enjoyed a parity with Birmingham to the Pacific coast points. The report of the commission says a substantial amount of coke has been imported from foreign countries through Pacific ports, and to some extent foreign coke has driven domestic coke off the Pacific coast. The Durham Coal & Iron Co. and its predecessor, it was said, have sold foundry coke on the Pacific coast for 25 years.

Senators To Expedite Tax Bill

Finance Committee May Begin Work Jan. 4 and Report Measure by Jan. 20—Final Action Probable March 4—Surtaxes and Estate Levies Likely To Be Increased

WASHINGTON, Dec. 29.—Some of the Republican leaders in the senate who are charged with steering the tax reduction measure through uncertain channels believe the bill for real reductions in all taxes may be whipped into shape for Presidential signature by March 1.

It is admitted that the course will not be so free from snags as when the measure passed the house, practically unchanged, in record time for the enactment of a revenue bill. Senator Smoot, of Utah, chairman of the senate finance committee, plans that his committee shall start studying the tax measure in executive session Jan. 4, when congress reassembles.

This means that the bill may be delivered on the floor of the senate by Jan. 20, which apparently gives it ample time to be worked over into a revenue law by early in March. The final vote in the senate, however, will not be as overwhelmingly in favor of the bill as it will be reported as was the case in the house.

Indications are that the senate may increase surtax and estate tax minimums somewhat. That the maximums will be lifted above 25 per cent, which would be a considerable reduction from the 40 per cent maximums of the present law, is doubted.

Bill Would Abolish Publicity

One of the features of the bill that worries the majority of Republicans is the provision for the repeal of the publicity section of the 1924 revenue act. It is realized that the vote on the publicity of tax returns may be close in the senate, despite the wide margin by which the section was approved by Republicans and Democrats in the house.

A canvass of sentiment in the senate convinces several of the Republican leaders that the Democrats will be unable to make a partisan issue of the publicity question. The La Follette group will take the initiative in proposing an amendment for the retention and even for the broadening of the present publicity section. Many of the Democrats will support such an amendment, as will a few of the so-called independent Republicans.

On the other hand it is believed enough Democrats favor the repeal of the present publicity section to offset the probable defections from the Republican ranks.

At the request of the senate finance committee, treasury experts are preparing tabulations showing possibilities for further reduction in miscellaneous taxes. Senator Smoot would like to wipe out what remains of the automobile tax, and also favors repealing the admission tax and some of the remaining stamp taxes. Repeal of the 3 per cent tax on sales of automobiles, still remaining under the house bill, would mean a yearly revenue loss to the government of $69,000,000, while the admission tax repeal would cut revenue by $29,000,000. The $42,000,000 which would be available if personal exemptions are reduced scarcely would permit all of these repeals.

Some other changes are in the minds of Republican leaders in control of the senate finance committee, that have not yet been disclosed. One of the changes likely will be to restore the exemptions of $1000 for single persons and $2500 for heads of families in the present law in place of $1500 and $3500, as provided in the bill passed by the house. This would lessen the reduction in income taxes to individuals, but would bring $42,000,000 in revenue to offset repeals or reductions of additional miscellaneous taxes.

The senate finance committee wants to make some changes in the house bill to bring it into conformity with the views of President Coolidge and Secretary of the Treasury Mellon.

The Democratic leaders in the senate do not show a disposition to join with the recalcitrant Republicans, as was done when the 1924 revenue bill was passed, and which helped to defeat many of the Mellon proposals. Some of the Democrats now are more likely to hew to the line of the administration tax bill than are some of the Middle West and Far West Republicans.

Senator Simmons, of North Carolina, ranking minority member of the finance committee, plans to present proposals in committee for increases in surtax rates and estate tax rates and for the repeal of more of the miscellaneous taxes. He will oppose the restoration of personal exemptions of the present law and probably will propose increases over the house bill exemptions. He will fail to obtain committee approval, but will present a minority report to the senate asking for amendments from the floor to suit the minority Democrats.

Some of the Republican spokesmen admit that amendments probably will come from the floor of the senate that will make the measure a little less satisfactory than the house bill, which was hurried through along the lines laid down in the ways and means committee sessions.

Railroads' Expenditures Save Shippers Millions

Washington, Dec. 29.—Ability of the railroads this year to meet transportation demands has been due, to considerable extent, to the capital expenditures they have made for the improvements in the last few years, to their equipment and plant facilities, it is declared in a statement by the American Railway association.

"Through these expenditures the railroads have been able to bring about various economies in operation," the statement continues, "that otherwise would not have been possible. By handling this record freight traffic expeditiously and with the greatest efficiency on record, the railroads have saved millions of dollars to the shipping public by the prompt movement of commodities to market."

It is estimated that for the entire year, 50,900,000 cars will have been loaded with revenue freight, exceeding last year's activities by nearly 2,500,000 cars, or 5 per cent. The railroads will have placed in service by Jan. 1 a total of about 130,000 freight cars.

Patent Office's Work Is Speeded Up

Washington, Dec. 29.—Work is being speeded by the United States patent office on the products of American inventive genius as a result of changes in administration which have recently become effective, it is pointed out in the annual report of Thomas E. Robertson, commissioner of patents, submitted to Secretary of Commerce Hoover. The patent office has

increased its expert staff as well as its facilities.

It is pointed out that new patents have been passed upon within an average of three months, as against five months the preceding fiscal year, and corresponding improvement was made in the time necessary to dispose of amended cases. The patent office was transferred to the commerce department last April, after having been under the interior department for 76 years.

During the year the patent office handled applications totaling 103,705, as against 99,724 during the corresponding period last year. With the exceptions of the year 1921 and 1922, when patent applications withheld during the world war were submitted in large numbers, the number of applications filed during the period under review was the largest in the history of the patent office.

Applications for patents for inventions, designs and reissues increased from 76,689 in 1924 to 82,213 in 1925.

Commissioner Robertson calls attention to the need for larger and more improved facilities for the patent office. Citing in this particular the favorable recommendation of a Presidential commission in 1912, he states that since that time the patent office has granted 500,000 patents, or about one-third of all patents issued. He further recommends that the increased temporary staff authorized by congress be continued in part, until it is absorbed by filling vacancies.

"Industries throughout the breadth of the land depend upon rapid results from the patent office," Commissioner Robertson states, "and are checked in their growth when the patent office lags behind."

Manufacturers Taking Up Commercial Aviation

Detroit, Dec. 29.—The use of commercial aviation as an adjunct to industrial activity is becoming more popular in Michigan. Started early in the year by the Ford Motor Co., the use of commercial aircraft has so far advanced that three industrial concerns are maintaining their own flying service, as an aid to buyers, and as a means of speeding up interfactory deliveries.

The Ford company has found the experiment a decided success. Regular flights are made daily between Detroit and Chicago, mail and motor parts being transported. Regular flights also are made to Cleveland and other points. The company has announced service will be enlarged as rapidly as found feasible. While the cost of aircraft transportation is higher than express or parcel post, the avoidance of delays in starting, and the rapidity of communication has been found ample compensation where speed has been the prime requiste.

The Ford company has its own airplane manufacturing plant, the Stout Metal Airplane division, and is using its own planes exclusively.

The second industrial concern in the state to inaugurate flying service was the Duplex Printing Press Co,., Battle Creek. The company has two fast planes ready at all times for the transportation of replacement and repair parts needed in emergencies by newspapers. One plane has a capacity of 2000 pounds deadweight.

The third company is the Continental Motors Corp, which has just purchased a 10-passenger airplane, to be used for regular transportation between the Detroit and Muskegon plants of the company.

Arbitration Reduces Business Waste

Washington, Dec. 29.—Answering inquiries from business men regarding the new federal arbitration act, the passage of which was strongly supported by the department of commerce, and becomes effective on Jan. 1, 1926, Secretary Hoover declared today that he believed the act represented an important step toward elimination of business waste.

"The information collected by the department of commerce over the past several years," he said, "clearly showed that the substantial element of the American business public is overwhelmingly in favor of arbitration in the settlement of commercial disputes in both domestic and foreign trade. In addition it has the approval and support of leading members of the bar throughout the United States."

In the field of waste elimination it comprises another important advance, according to the secretary, and as a result he says that he has "encouraged every reasonable movement in making arbitration accessible to merchants everywhere."

The new law was passed at the last session of congress. By this law, written provisions for arbitration in maritime transactions or in contracts evidencing transactions involving commerce with foreign nations or among the several states, for the first time, are made enforceable in the federal courts. If so contracted judgment may be entered on the awards of arbitrators by simple procedure. Awards may be vacated by the courts only if procured by improper means, if the arbitrators were guilty of misconduct or if they exceeded or improperly executed their powers in material manner.

In discussing arbitration with departmental officials, representatives of trade associations and chambers of commerce have offered the following suggestions as of possible use to those interested in taking advantage of the new law:

Trade associations, chambers of commerce, trade exchanges and other commercial bodies who desire to promote the use of arbitration should set up arbitration bureaus, boards or groups to deal with disputes not only between their members but between their members and outside business organizations and, where feasible between business organizations which are not connected with them.

Rules of procedure and methods of actual practices in conducting an arbitration hearing which have been tested by arbitral groups already in existence should be investigated and suitable practices and standards adopted by new groups. The establishment of such groups is not difficult but it should be undertaken conservatively with full appreciation that experience is one of the factors necessary to the more successful operation of such a body with recognition that arbitration is not a universal substitute for litigation nor a panacea for its resulting ills.

Arbitration committees of trade bodies may consider it desirable to proceed with the appointment of reputable business men who are willing to serve as arbitrators.

To aid business men interested in arbitration the department of commerce through its division of commercial laws will endeavor to furnish information within the scope of its activities concerning operation under the federal law and the arbitration of international commercial disputes. It will also provide means through which trade bodies and groups interested in arbitration may be put into communication.

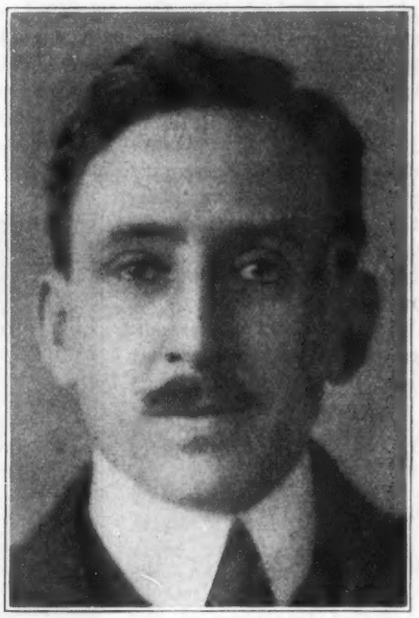
Industrial Men in the Day's News

Frank Purnell, Assistant President of Youngstown Sheet & Tube Co.

STARTING as a hall boy with his present company he has advanced to one of the most responsible executive positions in his organization.

ALTHOUGH connected with other corporations at various times he always has been regarded by his friends as a Sheet & Tube man.

PRIMARILY a sales executive, his contact with the many ramifications of the steel industry has made him widely known.



KEEN business foresight added to natural abilities as a leader have brought many advancements to Frank Purnell, the most recent being his elevation to the new office of assistant president of the Youngstown Sheet & Tube Co. This amounts practically to the direction, in the absence of the president, of the third largest independent steel company in the country, at the early age of 39 years. In making the appointment, James A. Campbell, president of the company, emphasized the importance of this step, saying, "An assistant to the president is a dignified errand boy. Assistant president is an official who shares the duties of the chief executive and takes his place during his absence." Appointment of Mr. Purnell is a further indication of the wish of Mr. Campbell, now 71 years old, to relinquish gradually the responsibilities of his position to a younger man.

Modest and retiring to the extreme, Mr. Purnell received the congratulations of his associates and of his legion of friends in the steel industry with embarrassment. "I just worked hard," Mr. Purnell said, when asked to explain his advancement. "I am keenly conscious of the honor bestowed on me and I am alive to the burden of responsibilities which I will have to shoulder."

"There is steel in the air of the Mahoning valley," a prominent steel man once said, and it is not unlikely that the atmosphere permeated the ambitions and desires of Mr. Purnell when young. Son of a steelworker in a family of modest income, his advancement and abilities have been developed by personal determination and aggressiveness. He was obligated to go to work early in life, quitting high school to become a "hall boy," now known as a messenger boy, in the offices of the Youngstown Sheet & Tube Co. This marked his entrance into industry 24 years ago.

"I wanted to go into the mills and learn the making of steel at the ladles," Mr. Purnell said. "Richard Garlick, at that time treasurer of the company, would not let me. He kept me in the office."

Consequently Mr. Purnell never became an operating man, but his knowledge of the steelmaking industry has grown wide. During the war he was made assistant to J. Leonard Replogle in charge of the steel division of the war industries board. After the war he left to become vice president of the Consolidated Steel Corp., the export subsidiary of independent steel producers.

It was in connection with this company that Mr. Purnell greatly impressed Mr. Campbell. Mr. Purnell advised steel companies involved that the Consolidated Steel Corp. should be liquidated. Although he was practically in charge of the company's affairs, he believed that competition would be limited with European iron and steel produced by cheap labor. He talked himself out of a job but was drafted immediately by the Bethlehem Steel Export Corp., with a vice president's title.

Several months later Walter E. Manning, vice president of the Sheet & Tube company died. Mr. Campbell immediately sought to re-obtain the services of Mr. Purnell. Mr. Purnell came back to the company where he started without knowing what his salary or position would be. Mr. Campbell asked him, "Frank are you coming back to us," and Mr. Purnell said "Yes."

Describing the new assistant president, another executive of the Sheet & Tube company says, "He is just a cork. You could not keep him down. He had so much ability that he just floated always on top."

Men of Industry

Personal News of a Business Character Pertaining to the Iron and Steel and Related Fields of Enterprise

W. SAYERS, formerly chief engineer of the Philadelphia plant of the Link-Belt Co., Chicago, manufacturer of conveying machinery, cranes, loaders, and other equipment, has been appointed chief engineer of the company, a position just created. Mr. Sayers was graduated from the University of Illinois in 1897 and has been affiliated with the Link-Belt Co. for 23 years, during which time he has been in the engineering, construction and sales departments of the company.

George L. Morehead, for the last six years connected with the management of the Indianapolis plants, succeeds Mr. Sayers as manager of the Philadelphia plant. Mr. Morehead was graduated from the University of Missouri in 1902 and has been with the Link-Belt Co. for 19 years.

* * *

Fred Galster, president of the Acme Wire & Iron Works, Detroit, has been re-elected treasurer of the National Association of Ornamental Iron and Bronze Manufacturers.

* * *

G. A. Dockeray, formerly general manager for the Moreland Motor Truck Co., Los Angeles, has been appointed sales manager for the Eagle Radiator Mfg. Co., that city. The Eagle company manufacturers products for the truck, tractor and aeroplane industries.

* * *

Stephen McGovern, formerly with the Matthew-Addy Co., and more recently resident manager at St. Louis of Domhoff & Joyce, pig iron and coke interests, has joined the sales forces of the Sterling Steel Co., East St. Louis, Ill. The Sterling company specializes in steel castings by electrical process.

* * *

Gerard Swope, president of the General Electric Co., Schenectady, N. Y. a native of St. Louis. has deposited $50,000 with a bank in that city, the income to provide St. Louis boys and girls with scholarships at American universities. The gift is a memorial to Mr. Swope's father and mother.

* * *

James W. Owens, the navy's authority on welding, will become affiliated with the Newport News Shipbuilding & Dry Dock Co. Jan. 1 as director of welding. Mr. Owens became associated with the welding committee of the Emergency Fleet Corp. in April, 1918, and in September, 1918, received a special appointment at the Norfolk yard as welding aide. He organized the first welding shop in the navy, trained a large number of

JAMES W. OWENS

welders, has conducted many fundamental researches in welding and is the author of a book *Fundamentals of Welding.*

At the Newport News Shipyard, Mr. Owens will have responsible charge of all welding development. Mr. Homer L. Ferguson, the president of the company, has decided to extend the use of welding to all classes of work undertaken by his company in the future. Mr. Owens was one of the organizers of the American Welding society, is a former vice president of the society and a member of the American Institute of Electrical Engineers.

* * *

Newlin T. Booth, president of the Deemer Steel Casting Co., New Castle, Del., has been elected president of the Delaware safety council to succeed C. H. Quackenbush, resigned. For the past year Mr. Booth has been industrial vice president of the Delaware council. Before becoming connected with the Deemer company he was a superintendent of a plant for Bethlehem Steel Co.

* * *

Otto Mueller, formerly purchasing agent for the Edward G. Budd Mfg. Co., Philadelphia, now is spending most of his time at Detroit where he is handling requirements of the Budd Wheel Corp., and for the large new building of the Edward G. Budd Mfg. Co. in that city.

Frank W. Bowker, formerly assistant to Mr. Mueller at Philadelphia has been appointed purchasing agent of the Edward G. Budd Mfg. Co. in that city.

* * *

C. R. Harvey, formerly sales manager of the Welded Steel Barrel Corp. has severed his connections with that company and is now representing in Michigan and Ohio, the Air-Tight Steel Tank Co., and the Pittsburgh Range Boiler Co., both of Pittsburgh. Mr. Harvey also is representing the Petroleum Iron Works Co., Sharon, Pa. For about 13 years he has been in the steel sheet fabricating business and is well known in the trade. Mr. Harvey has established an office in Detroit at 222 West Larned street.

* * *

Joseph G. Butler Jr., most widely beloved citizen of Youngstown, O., was named by the board of education of that city Monday night, Dec. 21, in a series of resolutions both congratulatory and grateful. The occasion was the passing of the eighty-fifth birthday anniversary of Mr. Butler at his home on Wick avenue. The veteran ironmaster was the recipient also of a number of warmly congratulatory messages from good friends and other important men in the iron and steel industry of the country.

* * *

George G. Crawford, president of the Tennessee Coal, Iron & Railroad Co., recently was presented a handsomely inscribed loving cup by the Kiwanis club of Ensley, Ala. The formal presentation was made by Erskine Ramsey, Alabama's Kiwanis governor, in the presence of a company of distinguished men of the Birmingham district. The inscription recounts: "Presented to George Gordon Crawford by the Kiwanis club of Ensley, Dec. 17, 1925, in recognition

of his service and as a token of esteem of the people of Ensley."

* * *

H. P. Kruelen, foundry expert with the Bethlehem Steel Co., Bethlehem, Pa., sailed Dec. 16 from Vancouver, B. C., for New Zealand and Australia.

* * *

D. F. Bush, chairman of Rogers, Brown & Crocker Bros., Inc., New York, has sailed for a short trip to the West Indies.

* * *

Clayton Mark, president of Clayton Mark & Co., Chicago, has been re-elected president of the Chicago Civic federation.

* * *

C. J. Thorne, in the sales department of the Turner Mfg. Co., Kokomo, Ind., automobile accessory manufacturer, has been appointed general sales manager.

* * *

S. A. Harris now is metallurgist for the Steel Improvement Forge Co., Cleveland. He formerly was in the metallurgical laboratory of the Bourne-Fuller Co., that city.

* * *

Roy Covert, formerly connected with the Washington Iron Works, Los Angeles, has been appointed superintendent of the Liberty Foundry Co., that City.

* * *

R. L. Ottke, of the Standard Sanitary Mfg. Co., Pittsburgh, was elected president of the National Association of Brass Manufacturers at their annual convention, Dec. 10.

* * *

James Gill, formerly assistant general sales manager of the Foster Bolt & Nut Mfg. Co., Cleveland, manufacturer of bolts and nuts, has been appointed general sales manager effective Jan. 1.

* * *

P. Welch, formerly with the Sterling Wheelbarrow Co., West Allis, Wis., has been appointed sales engineer for the Milwaukee Foundry Equipment Co. and will have charge of molding machinery sales in Ohio, eastern New York and eastern Pennsylvania.

* * *

H. H. Champ, Hamilton, Ont., has been appointed director of the Steel Co. of Canada, Ltd. He has been secretary and treasurer for some years. He is connected prominently with the Canadian Manufacturers association.

* * *

Dr. Keiji Ito consulting engineer of the Toho Electric Power Co. and professor of the Tokyo Institute of Technology spent a few days of his brief United States visit at the East Pittsburgh plant of the Westinghouse Electric & Mfg. Co. recently. Dr. Ito is a graduate of Tokyo institute of technology and a post graduate of Harvard university.

* * *

James W. Sneyd, for 14 years with the National Acme Co., Cleveland, manufacturer of automatic machine tools and screw machine products, has resigned as manager of the die department to join the Geometric Tool Co., New Haven, Conn.

* * *

E. F. Gohl, formerly contracting manager for McClintic-Marshall Co., Pittsburgh, at its Baltimore office, has been placed in the same capacity at Los Angeles.

F. A. Long, manager of erection at Pittsburgh, also has been moved to the Los Angeles office.

* * *

J. Milton Hughes, who has been assistant superintendent of the Lowellville furnace of the Sharon Steel Hoop Co., has been made superintendent to succeed W. C. Holzworth, resigned, to accept the management of the Struthers furnace. Mr. Hughes started as check boy with Sharon Steel company 21 years ago.

* * *

Charles David Marx, professor emeritus of civil engineering in Leland Stanford university, Stanford, Calif., has been elected chairman of the arch dam investigation committee of the Engineering Foundation. Prof. Marx is a past president of the American Society of Civil Engineers. He was born in Toledo, O., Oct. 10, 1857 and was graduated from Cornell univerisity. He studied also at Karlsruhe Polytechnic institute, Germany, and University of California.

* * *

Frederick V. Lindsey has been appointed sales manager of resistance materials by the Driver-Harris Co., Harrison, N. J. Mr. Lindsey has been identified with the manufacture of nickel and nickel alloys for many years, being vice president and secretary of the Electrical Alloy Co. previously.

* * *

Lewis E. Wallace, who has been assistant sales manager at Cleveland for the Youngstown Sheet & Tube Co., has just been appointed sales manager at Detroit, effective at once, succeeding G. W. Bostwick, resigned. Mr. Wallace went with the Youngstown company ten years ago in the East Youngstown offices. After gaining considerable experience there, he was assigned to the Chicago sales offices of the company. Three years ago he was transferred to the Cleveland sales offices. Mr. Wallace is a graduate of the University of Virginia, Charlotteville, Va., where he studied law and was admitted to the bar of that state.

* * *

Harry D. Carlton, vice president of Manning, Maxwell & Moore, Inc., New York, in charge of its steam specialties department, has assumed charge of machine tool and crane sales. N. J. Wainwright has been appointed general sales manager of the machinery department, and Thomas S. Stephens, manager of railroad sales of the machinery department. William D. Clarke has been appointed general sales manager of the crane department.

* * *

Maj. Samuel D. Heed, vice president of the Union Gas & Electric Co., Cincinnati, has resigned to become president of the Hurley Machine Co., Chicago, Jan. 1. Major Heed had been with the Union company since 1920. He was president of the Gas & Electric Appliance Co., a subsidiary, and vice president of the Columbia Engineering & Management Co. The name of the Hurley Machine Co., manufacturer of electrical houschold appliances, will be changed to the Electrical Household Utility Co. Major Heed will succeed Neil C. Hurley as president. The latter, who is a brother of E. N. Hurley, formerly chairman of the United States shipping board, will become chairman of the board under the reorganization.

* * *

H. Oliver Williams, efficiency engineer, attached to the executive department of the Bethlehem Steel Corp., Bethlehem, Pa., has resigned to become vice president in charge of sales of the Braeburn Alloy Steel Corp., Braeburn, Pa.

In steel circles Mr. Williams is widely known. For 12 years he was affiliated with the Carnegie Steel Co. in the Homestead and Duquesne Steel Works, and later was assistant to James M. Camp, chief of bureau of instruction, Pittsburgh. He was connected also with the general sales of Carnegie Steel Co. and in 1919 resigned to become assistant manager, railroad division of the general sales, Midvale Steel & Ordnance Corp., Philadelphia. Subsequently he was transferred to the Cambria plant, Johnstown, Pa., as assistant to the general superintendent, which Mr. Williams maintained until the Bethlehem Steel Co. merger, when he was appointed assistant to the general manager, later being transferred to the executive department, Bethlehem, Pa., which he just left. Mr. Williams was also president of the Conemaugh & Blacklick railroad.

British Iron Gains More than Steel

(*Concluded from Page* 1679)

tion with nut and bolt making. The continued strike in Charleroi has deprived the trade of cheap Belgian iron bars which formerly were obtainable in large quantities at £3 ($14.55) to £4 ($19.40) below the Staffordshire price. The supply of foreign material is no longer forthcoming. But the nut and bolt makers have preferred to find salvation by using steel bars, replacing their machinery with more powerful plant.

Reports are continually being received from the Continent to the effect that French mills and many Belgian works have their order books furnished until the end of February, and that prices are likely to be firmer. A somewhat inconsistent sequel is the continual arrival of lower quotations. For example, one received in Birmingham three days since offered mild steel ship plates at £5 17s 6d ($28.48) f.o.b. Antwerp, a reduction of 1s 6d ($0.36) on the figure given a week earlier. Steel plates of various sizes ranging from ¼-inch upward are 2s 6d ($0.60) cheaper, and steel sheets are also a trifle lower in price. English builders are still buying Belgian steel joists to a tensile of 28/32 tons at £4 18s 6d ($23.89) f.o.b. Antwerp, or about £1 ($4.85) below the figure required for English material. Steel universal plates at £5 15s ($27.88-f.o.b. represent a price impossible to British makers.

Steel scrap is moderately firm at £3 7s 6d ($16.36) delivered South Wales. A few venturesome merchants quoted 2s 6d ($.) above this price but lost the business. Staffordshire makers of wrought iron have been slightly busier. Staffordshire bars remain unchanged for medium qualities, this class of iron having been reduced in advance of best material which sustained a cut of 10s ($2.42) a week ago.

Galvanized sheet orders have not been plentiful, most of the large markets such as Australia, South America and South Africa not having passed the inquiry stage. The activity in the west of Scotland in the production of thin gages has led to a rise of 5s ($1.21) in 24-gage sheets, making the price £18 ($87.30) for exports. The principal buying is for the lighter type of sheets. The South Wales price continues at £16 12s 6d ($80.62) up to £16 15s ($81.20). The black sheet trade remains fairly busy.

New sales for tin plate are not numerous, but the market is sufficiently strong to maintain £1 ($4.85) per box. Occasionally, it is possible to buy at 19s 9d ($4.79), but these transactions relate to second hands bought speculatively, the moment being regarded as opportune for unloading this material. Prices of tin bars remain at £6 5s ($30.31) with rather more business. This is the association price, and the unassociated firms do not appear to be undercutting. A lot of foreign material is on offer at £1 ($4.85) less, and large tonnages are being used for sheet rolling, makers of tinplates for the most part preferring British material.

German Exports Grow, Imports Less

BERLIN, Dec. 20.—(*European Staff Service*)—Although the general situation of the German iron and steel market has not improved during recent weeks, and athough complaints by works, merchants and consumers continue to increase, German exports in October again showed a small advance. Imports, on the other hand, slightly decreased, although French competition on the German market is heavy, owing to the collapse of the franc. French exports of steel to Germany during the ten months ended Oct. 31, totaled 270,000 metric tons against only 120,000 tons during the corresponding period a year ago. German imports of iron and steel in October were 100,408 metric tons, compared with 124,132 tons in September. Exports were 358,831 tons in October and 308,040 tons in September. So far this year exports have been about twice those of 1924 which were handicapped by the occupation of the Ruhr. America recently has been a better buyer in this market. October exports of pig iron to the United States totaled 5761 metric tons against 2845 tons in September. German shipments of pig iron to all destinations increased from 12,148 tons in September to 21,544 tons in October. Sales of bars and structural shapes advanced from 62,428 tons to 84,259 tons, medium sheets from 4599 tons to 6136 tons and thin sheets from 2096 tons to 2277 tons. Sales of galvanized sheets increased from 1099 tons to 1430 tons, while exports of ship plates and tinplates decreased.

Notwithstanding these improvements German export business continues dull, although the position is now better than some months ago as German prices in the meantime have been reduced as a result of the depression on the domestic market. Export bounties for December have been augmented and such bounties are also paid now for sheets. It is intended to grant export bounties on foundry pig iron as well. Exports of wire have improved despite the unfavorable prices, and wire rods are sold at £5 15s ($27.95) f.o.b. by the wire rod association. The pipe association denies the report that large American orders have been booked and states that it has taken one American order for 6000 tons of gas pipe which is now produced by Thyssen. The Linke-Hofmann-Lauchhammer company have succeeded in booking interesting Brazilian and Egyptian orders for cars, locomotives, motors and boilers. The makers of iron hardware of the Velbert district have received some fair orders from the Russian government. German producers of rails and railroad material for the permanent way are negotiating with the Finnish railroads for the supply of material for the intended extension of the Finnish railways.

The domestic market is slack. Consumers are reluctant owing to the shortage of capital. Unfilled orders at works have considerably decreased. The position of the merchants is still more unsatisfactory, and they are underbidding prices of the various associations. Shutting down of mills continues. Krupps has dismissed 1200 more workers and intends reducing the staff to about 10,000. Thyssen also reports dismissals, while the Rhenanian steel works and other works have closed down part of their plants. The Hannover Machine Co. has entirely closed down. It is not astonishing that the financial results are unsatisfactory and that some of them, such as the small Krone steel works, have had to go under official receivership. The Laurahuette company is distributing no dividend for the past fiscal year, and the Phoenix company has likewise refrained from distributing a dividend, although a net profit of 1,200,000 marks ($286,-000) has been made against 31,700,-000 marks ($7,590,000) in 1913.

The situation in the pig iron market is further depressed and the output has been reduced, since only 30 per cent of furnaces are still active. Negotiations for the construction of the Ruhr iron trust have not succeeded so far, as opposing difficulties have increased.

Arbed, Belgian Producer Has Good Year

BRUSSELS, Dec. 20.—(*European Staff Service*)—The annual general meeting of the stockholders of the Acieries Reunies de Burbach-Eich-Dudelange, known as the ARBED, was held at Luxemburg Nov. 28. The report of the board of directors stated that in view of the difficulties under which the iron and steel industries are laboring, the past year was satisfactory. At the time of the meeting it was stated that a revival of business appeared to be under way. During the fiscal year 1924-25 the mines operated by the company produced 2,-922,472 metric tons, as against 2,-533,970 tons in the preceding year. The cokeries at Burbach produced 403,752 tons, as against 382,523 tons. The output of pig iron was 1,206,-162 tons, as against 1,004,872 tons. The basic bessemer and open-hearth steel plants produced 1,181,800 metric tons of steel in 1924-25, compared with 985,473 tons in the preceding year. The production of electric steel was 1101 tons, against 1143 tons. The production of rolled steel was 966,771 tons and 812,139 tons respectively; the output of iron and bronze castings was 27,897 tons, as against 20,888 tons. Steel castings were 4915 tons and 4113 tons respectively. The company employed 18,-347 workers and 930 staff employes.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

BRUCE PRODUCTS CORP., 173 East Woodbridge street, Detroit, has bought a plant at Howell, Mich., where it will manufacture its entire line of metal finishing materials. The plant contains 50,000 square feet of floor space, with power plant. Additional equipment will be purchased and the buff department will be tripled to meet present demands. Offices and warehouses will be maintained in Detroit at 5073 Grand River avenue.

* * *

STANLEY WORKS, New Britain, Conn., has put in operation a hydro-electric plant, one of the largest in New England, at Rainbow, near Windsor, Conn.

* * *

ACME MACHINE PRODUCTS CO., Detroit, recently formed, has elected Leo K. Hennes, Detroit, president and Earl A. Munger secretary and treasurer. The company will manufacture automotive parts.

* * *

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa., has taken an unusually large order for lighting equipment for St. Louis, placed through the Ryckoff Construction Co., Chicago. It includes 10,000 standard lighting units, reflectors and auxiliary equipment.

* * *

BIFLEX PRODUCTS CO., Waukegan, Ill., manufacturer of automobile bumpers, is adding a unit to its plant to provide 15,000 square feet of floor space on one floor. This addition is to relieve pressure for increased production on the Waukegan and Decatur, Ill., plants.

* * *

NORTHERN BLOWER CO., West Sixty-fifth street and Barberton avenue, Cleveland, has started construction of an addition 75 x 100 feet to house a testing and experimental department. A further addition to increase its manufacturing facilities will be undertaken as soon as this addition is completed.

* * *

AMERICAN BRIDGE CO. is building 12 steel double-bottom barges for the Tennessee Coal, Iron & Railroad Co. They will be 25 x 140 feet and nine feet deep, with bulkheads and are for service on the Warrior river. This company recently completed 12 barges for the Crucible Fuel Co. and five for the Ohio River Co., five more to be delivered soon.

* * *

E A. FALK, general agent of the Chicago, Milwaukee & St. Paul railroad at Milwaukee, has made a survey of industrial conditions in that city and finds orders totaling more than $30,000,000 are on the books of manufacturers there for delivery in the first half of 1926, more than half being for iron and steel castings and machinery. Three concerns have a total of $14,000,000 in orders on books and deliveries are becoming a problem.

* * *

BALDWIN LOCOMOTIVE WORKS, Philadelphia, has begun moving its boiler shop from its Broad street plant to Eddystone. This is one of the first steps of the company's removal program, which is expected to cost close to $16,000,000 and which possibly in five years will center all of the company's manufacturing activities at Eddystone. At present 65 per cent of its locomotive building facilities are located there.

* * *

ROLLS-ROYCE OF AMERICA, Henry J. Fuller president, announces it has bought control of the plants and business of Brewster & Co., maker of automobile bodies, which has been a leader in carriage and automobile body work for more than a century. The plant at Long Island City will be continued and William Brewster will continue as president, becoming also a vice president of the Rolls-Royce company.

* * *

LONDON Motor Plow Power Lift, Springfield, O., has been organized to take over the patents, rights and assets of the London Motor Plow Co. and has brought out a new type of power plow lift for Fordson tractors, the invention of E. H. Daniel, inventor of the former type. The new company is owned and controlled by R. W. Johnston, Columbus, O. The plant of the former company in the Shuey building will be continued and it is expected 200 units per week will be built shortly. The plows will be furnished by the Oliver Chilled Plow Co., South Bend, Ind., and the lift will be sold only through Fordson dealers.

* * *

L C. SMITH & BROS. TYPEWRITER INC., Syracuse, N. Y. and the Corona Typewriter Co. Inc., Groton, N. Y., are being merged. The former manufactures an office typewriter and the latter a portable. Frank R. Ford of Ford, Bacon & Davis, New York, will be executive head of the combined companies. All the plants of the two companies will continue operation and present personnel will be retained.

* * *

NATIONAL IRON & WIRE CO., 3911 Hamilton avenue, Cleveland, has bought the former plant of the E. W. Bliss Co., St. Clair avenue and East 22nd street, including 5½ acres and a factory building containing 44,000 square feet floor space. Capacity will be doubled by the purchaser. National Iron & Wire Co. is headed by Charles H. Brandt president, James Craig vice president and general manager and W. K. Billens secretary and treasurer. The company has been in its present location since 1891.

* * *

CONSOLIDATED LEAD & ZINC CO., St. Louis, will shortly absorb the Underwriters Land Co. and further expand by exercising options on mines and royalty interests to the extent of $2,500,000. The Eagle-Picher Co. owns a majority interest in the Underwriters Land Co. It has four large mills. Mines included in the consolidation have produced about 76,000 tons of zinc and 13,000 tons of lead concentrate during the present year.

* * *

AMERICAN HEAT ECONOMY BUREAU INC., Pittsburgh, has booked orders recently for its combustion systems for the following equipment: Illinois Steel Co., Gary, Ind., sixteen 400-horsepower boilers; Carnegie Steel Co., Carrie furnace, Homestead, Pa., 8 stoves; Edgar Thomson works, Rankin, Pa., 8 stoves; Midland Coke & Iron Co., Granite City, Ill., 3 stoves and three 800-horsepower boilers for its new furnace; Weirton Steel Co., Weirton, W. Va., 7 stoves and six 900-horsepower boilers.

Import, Export Data Analyzed

Canada Continues Heaviest Importer of American Steel—Cuba Buys Most Rails and Argentina Largest Barbed Wire Tonnage—India, Belgium, Netherlands and United Kingdom Supply Most of Imports

FURTHER analysis of data just released by the department of commerce on iron and steel exports for November reveals that as usual Canada continues the largest buyer of American steel. Japan continues to take mostly tin plate and steel sheets, being the leading market in November in both products. Cuba bought the largest amount of rails, taking 2559 tons and Argentina took 1070 tons of barbed wire, heading the list in that classification. An interesting shipment is that of 3856 tons of galvanized sheets to British India. The Philippine Islands also took 1933 tons of that product.

India supplied the largest amount of imports, 12,567 tons arriving in American ports from that country during November. Belgium furnished 10,287 tons, Netherlands 10,344 tons and the United Kingdom 10,474 tons. Other large shippers included France, Canada, Cuba, and Brazil.

Exports of metalworking equipment in November totaled close to the same amount as October, although such standard tools as chucks, boring and drilling machines decreased considerably. Exports of lathes fell from 102 in October to 69 in November. Chucks for machine tools decreased from 2010 in October to 921 in November. Milling machine exports furnished the largest gain, increasing from 36 to 96 in the October-November period.

Youngstown Sheet & Tube Co., Youngstown, O., announces its annual calendar, 1926 edition, 19 x 24 inches, with 12 colored illustrations of processes in the manufacture of iron and steel. Request to the publicity department at Youngstown, with postage, will bring the calendar.

Exports of Machinery in November

	November		Eleven months ended November	
	1925	1924	1925	1924
Lathes, number	142	111	1,367	734
Boring and drilling machines, No.	69	102	1,648	2,192
Planers, shapers and slotters, No.	21	22	286	237
Bending and power presses, No.	35	46	361	346
Gear cutters, No.	38	53	403	444
Milling machines, No.	96	36	936	402
Thread cutting and screw machines, No.	56	60	844	654
Punching and shearing machines, No.	9	14	195	180
Power hammers, No.	19	17	206	194
Rolling machines, No.	.....	.....	.....	.....
Sharpening and grinding machines, No.	.....	.....	.....	.....
External grinding machines, No.	57	56	1,256	2,634
Internal grinding machines, No.	34	10	299	455
Other grinding and sharpening machines, lbs.	104,725	140,169	1,290,507	1,101,712
Chucks for machine tools, No.	921	2,010	22,129	22,280
Reamers, cutters, drills and other metalworking tools, lbs.	172,669	199,092	3,166,807	1,789,864
Pneumatic portable tools, No.	967	1,228	14,298	12,937
Air compressors, No.	.....	399	.....	5,440
Cranes				
With swinging booms, No.	11	3	93	47
Other cranes, No.	38	12	188	205
Hoists and derricks, except, No.	434	534	5,430	4,488
Ball and roller bearing, and parts of chains, pounds	75,050	110,593	1,669,791	2,138,003
Sprocket and power transmission, lbs.	353,138	234,192	2,929,256	3,547,503
Other chains, lbs.	893,953	596,714	11,856,508	9,071,726

ORIGIN OF IMPORTS FOR NOVEMBER, 1925

(Gross Tons)

	Scrap	Rails
Germany	349	135
Sweden	98	.....
Canada	6,523	.....
Dominican Republic	6,037	.....
Belgium	.....	705
Netherlands	.....	519
Other countries	153	.....
Total	13,160	1,359

IMPORTS FOR NOVEMBER, 1925 BY COUNTRIES OF ORIGIN

(Gross Tons)

Country	Tons
Austria	34
Belgium	10,287
Czechoslovakia	551
Denmark	66
France	6,294
Germany	7,641
Greece	3
Italy	23
Netherlands	10,344
Norway	28
Spain	4
Sweden	2,322
Switzerland	2
United Kingdom	10,474
Canada	9,598
Bermuda	33
Other British West Indies	120
Cuba	6,076
India	12,567
Ceylon	1
China	1
Java and Madura	2
Hongkong	2
Japan	2
Kwangtung	50
Brazil	3,246
Total	79,771

DESTINATION OF IRON AND STEEL EXPORTS IN NOVEMBER

Gross Tons

Countries	Rails	Steel scrap	Steel bars	Galvanized sheets	Plates not fabricated	Tin terne plate	Steel sheets black	Barbed wire
Argentina	603	.....	.....	550	.....	263	81	1,070
Australia	.....	.....	120	22	.....	.....	.....	159
Belgium	.....	.....	.....	.....	.....	152	.....	.....
Brazil	55	.....	.....	590	.....	276	17	740
British South Africa	.....	.....	.....	78	.....	.....	.....	119
British India	.....	.....	.....	3,856	.....	512	.....	.....
Canada	225	5,165	6,825	1,558	8,527	2,311	4,017	264
Chile	422	.....	977	573	.....	347	.....	28
China	.....	276	181	302	40	5,634	18	.....
Colombia	325	.....	.....	973	.....	183	.....	624
Cuba	2,559	.....	642	1,218	164	191	32	437
Central America	.....	.....	.....	533	42	.....	.....	373
Greece	.....	.....	.....	.....	680	.....	.....	.....
Honduras	10	.....	.....	.....	.....	.....	.....	.....
Hong Kong	.....	46	.....	.....	.....	89	.....	.....
Italy	.....	.....	.....	.....	.....	195	.....	.....
Japan	1,856	697	.....	333	.....	5,704	5,706	.....
Mexico	128	.....	.....	420	270	303	83	308
Norway	.....	.....	.....	188	.....	.....	.....	.....
Europe	.....	.....	.....	.....	.....	.....	803	.....
Other Europe	.....	.....	.....	642	.....	.....	.....	.....
Other countries	775	.....	1,007	1,400	168	1,865	255	427
Other S. America	178	.....	.....	438	.....	.....	217	215
Peru	.....	.....	141	.....	.....	827	.....	.....
Philippine Islands	.....	.....	.....	1,933	243	17	52	593
South America	.....	.....	.....	.....	440	.....	.....	.....
Straits Settlements	.....	39	.....	.....	.....	.....	.....	.....
Turkey-in-Europe	.....	.....	.....	.....	.....	549	.....	.....
United Kingdom	.....	129	1,080	.....	.....	.....	.....	.....
Uruguay	.....	.....	.....	.....	.....	175	.....	.....
Venezuela	.....	.....	.....	.....	.....	55	.....	206
Total	7,136	6,352	10,973	15,607	9,894	20,328	11,281	5,561

Increase in Living Costs Offsets More Earnings

New York, Dec. 29.—Increases in average hourly and weekly earnings and in employment in October were recorded in the National Industrial Conference board's monthly survey in 25 manufacturing industries, indicating further improvement of business conditions.

Average hourly earnings of all wage earners advanced from 55.6 cents in September to 56 cents in October; average weekly earnings of all wage earners advanced from $26.94 in September to $27.12 in October. Of the 25 industries covered, 14 reported higher hourly earnings, and 16 higher weekly earnings.

Total employment gained more than 1 per cent during the month. The average working hours per wage earner remained at 48.3 hours per week; the average nominal or regular working week was unchanged at 50 hours.

A slight increase in the cost of living offset the gain in earnings, so that the "real" hourly wage did not increase, while the "real" weekly wage decreased slightly. "Real" hourly earnings in October stood 35 per cent, and "real" weekly earnings 27 per cent higher than in July, 1914.

Average hourly earnings classified by labor groups in some of the industries reporting to the board in October compared with those of September as follows:

	Male—Unskilled Oct.		Male—Skilled Sept.	
Agricultural implements	$.480	$.475	$.639	$.640
Automobile	.518	.512	.685	.703
Electrical Mfg.	.457	.461	.653	.675
Iron and steel	.478	.490	.690	.714
Foundry and machine shop	.489	.486	.642	.644
1. Foundries	.507	.509	.672	.680
2. Machine and machine tools	.462	.460	.620	.616
3. Heavy equipment	.494	.494	.702	.703
4. Hardware and small parts	.465	.443	.588	.594

Vote on Retail Price Plan

Washington, Dec. 29.—The United States Chamber of Commerce is taking a poll of 1400 business organizations to determine their attitude on bills introduced in congress to legalize the establishing of retail prices by manufacturers. Some reason is seen for such legislation in many lines, but it is doubtful whether any of the bills can survive in the present crowded session.

National Gear Co., care Joseph F. Edward, 7 South Dearborn street, has increased its capital stock from $150,000 to $250,000.

Obituaries

HENRY M. NORRIS, 57 years old, secretary of the Cincinnati Bickford Tool Co., Cincinnati, nationally known mechanical engineer, inventor and author of books pertaining to machinery, died suddenly Dec. 24. He was born in Trenton, N. J., and graduated from Cornell university. Mr. Norris served with the Ferrachute Machine Co., Bridgeton, N. J., the Brown & Sharpe Mfg. Co., Providence, R. I., and the Pond Machine Tool Co., Plainville, N. J. For about a year he was inspector for the Garvin Mfg. Co., New York and from 1893 to 1894 was superintendent of the Appleton Mfg. Co., Philadelphia. Between 1894 and 1897, the year in which he came to Cincinnati, he served as superintendent for the Riehle Bros. Testing Machine Co. and as general manager of the Campbell & Zell Co., Baltimore. Upon returning to Cincinnati Mr. Norris became engineer and works manager of the Bickford plant. From that time until 1909 he served in that capacity but from then on until the time of his death he was secretary and a director of the Cincinnati Bickford company. During the war Mr. Norris served as a member of the war industries board, the council of national defense and the ordnance department at large. He was one of the eight efficiency engineers selected for service in the ordnance department at the Watertown Arsenal. Mr. Norris was a pioneer member of the National Metal Trades association.

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Howard R. Wilson, treasurer and director of the Ames Shovel & Tool Co., Boston, died Dec. 15.

* * *

Frank A. Merrill, chief engineer of the Boston & Maine railroad and veteran builder of roads in New England died recently at his home in Lynn, Mass., at the age of 68.

* * *

Harry A. Lozier Jr., Cleveland, son of H. A. Lozier, one time large bicycle manufacturer and later manufacturer of the Lozier and Hal automobiles, died recently at Clearwater, Fla. Young Lozier was associated with his father in the business.

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Thomas P. Howard, Montreal, Que., died Dec. 16 at the age of 56 years. He was managing director for many years of the Phoenix Bridge & Iron Works, Ltd. In 1920 he was president of the Canadian Manufacturers association.

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Francis Von A. Cabeen, formerly prominent in the pig iron business of Philadelphia, and a partner of the old organization of J. Tatnall Lea & Co., died in that city Dec. 14 at the age of 76. He retired from active business some years ago.

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Harry Henry, assistant to the general purchasing agent of the Southern Pacific Co., San Francisco, died Dec. 21. He was born in Fort Scott, Kans., Dec. 12, 1879, and joined the Southern Pacific Co. in 1895. In 1913 he was assistant director of purchases in New York, returning to San Francisco in 1925.

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Emery E. Stevens, 44, assistant head of the mining department of Pickands, Mather & Co., Cleveland, died at his home there Dec. 23. Mr. Stevens was a graduate of Western Reserve university, Cleveland, and joined the Pickands company immediately afterwards. He became an assistant cashier and then was advanced to the position he held at his death.

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Franklin Huntress, representative of the St. Louis Car Co. and Laconia Car Co. at Boston, and active in street railway affairs for many years, died recently at his home in Somerville, Mass.

* * *

Francis W. Carpenter, inventor and manufacturer of toys, died at his home in Greenwich, Conn., Dec. 26 at the age of 81 years.

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Edwin Gray Rust, 56, district engineer for the Youngstown Sheet & Tube Co., died Dec. 25 of pneumonia, at his home there. Mr. Rust, prominent in engineering and construction circles and inventor of a boiler bearing his name, came to Youngstown three months ago to accept the position he held at the time of death. He was born at Leesburg, Va., Oct. 1, 1869. He was a lieutenant of engineers in the Spanish-American war and afterward located in Pittsburgh, where he became prominent in his profession. He served as a member of the United States shipping board during the world war.

Construction and Enterprise

Concise and Timely Business Building Opportunities from the Field of Industry

MOBILE, ALA.—Acme Machine & Welding Co. has been incorporated with $10,000 capital to manufacture machinery by W. R. Steber, A. H. Myers and T. L. Wilson.

MOBILE, ALA.—Ford Chassis Brace Co. has been incorporated with $15,000 capital to manufacture automobile appliances by E. J. Buck, J. F. McGowan and A. H. Holifield.

OAKLAND, CALIF.—F. A. B. Mfg. Co., 1850 Seventh street, will build a plant for the manufacture of barrel pumps, extension frames for trucks and other automotive specialties, at Vallejo and Sixty-seventh streets.

BRISTOL, CONN.—New Departure Mfg. Co., Center street, will build an addition 218x24 feet at its main plant and an addition to its forging plant on Terryville avenue.

CLAYMONT, DEL.—The Worth Steel Co. is making some new additions, including a soaking pit building.

COLUMBUS, GA.—Pekor Iron Works, Ninth street, is making additions to double its capacity.

AURORA, ILL.—Union Roofing Co., 85 South Broadway, has been incorporated with $2400 capital to manufacture roofing materials and sheet metal products by E. S. Todd, R. A. Murrin and Harold M. Stoll. E. L. Lyon, Aurora, is attorney.

CHICAGO—Cinch Mfg. Corp., Walter J. Rayner president, 2335 West Van Buren street, will build a 2-story addition 62x125 feet. Carl Hauber, 304 South Wabash avenue, is architect.

CHICAGO—Dowst Bros. Mfg. Co., manufacturer of toys and metal products will build a 4-story plant 100x100 feet at Fulton and Forty-sixth streets. A. S. Alschuler, 28 East Jackson boulevard, is architect.

CHICAGO—Midwestern Steel Corp., 5 East Garfield boulevard, has been incorporated with $50,000 capital to manufacture iron and steel products by L. R. Moser, Mrs. L. R. Moser and O. P. Tidd.

CHICAGO—Kalman Steel Co., 410 North Michigan avenue, will build a 1-story addition 47x68 feet at 1844 West Austin avenue. General contract to L. Balkin, 1850 West Austin avenue.

CHICAGO—Commercial Auto Body Builders, 3234 Archer avenue, will build a 1-story factory, office and garage 135x150 feet. William M. Hoffman Jr., 144 West Forty-seventh street, is architect.

CHICAGO—Englewood Iron & Metal Co., 1132 South Canal street, has been incorporated with $25,000 capital to deal in metals by Louis Goldberg, Samuel Goldberg and Hattie Goldberg. Herman Waldman, 56 West Randolph street, is correspondent.

CHICAGO—Daniel Ornamental Iron Works Inc., 552 West Lake street, has been incorporated with $25,000 capital to manufacture wrought and ornamental iron by Daniel Labonne, Robert W. Schumacher and John H. Vanbrunt, 1803 Burnham building, LaSalle and Randolph streets.

CHICAGO—Hands Constant Mesh Transmission Co., 5 North Wabash avenue, has been incorporated with $25,000 capital to manufacture transmissions by Jacob L. Kerner, Edward G. Berdan and I. W. Kohn. Condon & Livingston, 983 Illinois Merchants bank building, 231 South LaSalle street, are correspondents.

Where additional information is presented, reference is made to date of issue in which previous item appeared.

CHICAGO—Western Ignition Co., 127 North Dearborn street, has been incorporated with capital of 1000 shares no par value to manufacture controllers, generators, magnetos, combination batteries and magnetos and similar devices by C. B. Moore, Guy D. Handle, and Curt F. Reis. Gallagher, Kohlsaat, Rinaker & Wilkinson, 231 South LaSalle street, are correspondents.

FULTON, ILL.—Patent Novelty Co., W. J. Reimer president and manager, will build a 2-story factory 90x140 feet.

FULTON, ILL.—Illinois Metal Products Co. has been incorporated with $15,000 capital to manufacture automobile accessories by Frank W. Dana, George H. Reimer and Arch D. Rowan.

KANKAKEE, ILL.—Big Four railroad will build an addition to its engine terminal here. P. E. Crowley, Big Four building, Cincinnati, is president.

QUINCY, ILL.—Gardner Governor Co., South Front street, is having sketches made for a 1-story factory 100x250 feet. F. D. Chase, 720 North Michigan avenue, Chicago, is engineer.

RIVERSIDE, ILL.—Phoenix Burner Corp., 27½ Quincy road, has been incorporated with $100,000 capital to manufacture oil burners by Richard Todd, Frank S. Egloff and Ida Egloff. Harry L. Brundage, Monadnock block, 53 West Jackson boulevard, is correspondent.

KOKOMO, IND.—Turner Mfg. Co., 112 West Jefferson street, manufacturer of automobile equipment, will build a 1-story addition 82x137 feet.

MARSHALLTOWN, IOWA — Marshalltown Mfg. Co., J. M. Farber secretary and manager, is having plans prepared for a 3-story addition to its machine shop 60x75 feet.

PLAQUEMINE, LA.—Nadler Foundry & Machine Co., Inc. has been incorporated with $100,000 capital to operate the Nadler foundry and machine shops, by Carl S. Nadler president, Arthur Nadler vice president and Allen Nadler secretary and treasurer.

ATTLEBORO, MASS.—Guyot Bros. Co., Inc., hubs, dies and tools, has been formed with $100,000 capital and 1000 no par value shares by Gaston A. Guyot, Arthur F. Guyot, Carl W. Keil, and William C. Boots, all of Attleboro, Mass.

BOSTON—The Copperall Co. of America, machinery, has been incorporated with $50,000 capital and 300 no par value shares by John L. DesLauries, Taylor DesLauries, and Louis W. Belli, all of Scituate, Mass.

HOLYOKE, MASS.—The H. F. Davis Tractor Co. has been incorporated with $50,000 capital by Herbert F. Davis, Kenneth C. Gosling, Guy W. Hall, and Eleanor M. Davis, all of Holyoke, Mass.

DETROIT—Cadillac Motor Car Co., 1860 Clark avenue will build a 2-story addition to its service station on Cass avenue 150x207 feet.

DETROIT—General Necessities Corp., A. P. Walker, secretary, Park and Adams streets, will make extensive alterations to its 6-story plant.

DETROIT—Michigan Copper & Brass Co., manufacturer of copper, brass and aluminum sheets has awarded a contract to the Austin Co. for an aluminum smelting building, a second addition.

DETROIT—Zerofier Corp. has been incorporated with $75,000 capital to manufacture refrigerating machinery by Herbert C. Kellogg, James A. Morse and Oliver D. Ennis, 101 Philip avenue.

DETROIT.—Couzens Ice Machine Co. has been incorporated with $1,000,000 capital to manufacture refrigerating machinery by Frank Couzens, Clarence E. Wilcox and James Couzens, 610 Longfellow avenue.

DETROIT—Erb—Joyce Foundry Co. has been incorporated with $100,000 capital to manufacture foundry products by Montgomery Whaling and Charles R. Talbot, Detroit, and Fred Erb, 425 West Harrison street, Royal Oak, Mich.

JACKSON, MICH.—American Gear & Mfg. Co., C. C. Spencer manager, 617 South Park avenue, will build a machine shop, garage and oil storage building, 192x250. Everett Winters Co., 1024 Book building, Detroit, has general contract.

MONROE, MICH.—Monroe Auto Equipment Co. has rebuilt its plant burned 60 days ago, and has started operations.

MUSKEGON, MICH.—Muskegon Piston Ring Co. will build a foundry building as an addition to its plant.

MUSKEGON, MICH. — Less-Cole Products Co. has been incorporated with $10,000 capital to manufacture heat treating compounds by Fred A. Luther, Luther R. McCurry and Harry E. Nolan, 1032 Terrace street.

ST. LOUIS—Miller Mfg. Co. has been incorporated to manufacture motor accessories and equipment by Hy Miller, Charles J. Doran and George Donus. George E. Heneghan, National Bank of Commerce building, is attorney.

NEWARK, N. J.—General Sheet Metal Works Inc., 164 Market street, has been incorporated with $125,000 capital to manufacture sheet metal specialties.

PASSAIC, N. J.—Passaic Iron & Metal Co. has been incorporated with $100,000 capital by Joseph Bicoff, Passaic; Abraham Beaver, Paterson, and Barnet Levine, Passaic. Aaron Heller, Passaic, is attorney.

BUFFALO, N. Y.—Buffalo Alarm Clock Casing Co. has been incorporated with 100 shares no par value by L. V. Whistler, S. A. Whistler and C. P. Franchot.

BUFFALO, N. Y.—Buffalo Body Corp., Ken-

neth McDonald president, 500 Smith street, will rebuild its burned automobile body plant, 2-stories 70x110 feet.

DUNKIRK, N. Y.—Marsh Valve Co., W. C. Marsh president, is considering construction of an addition to its plant.

NEW YORK—Cee-Bee Machine Corp. has been incorporated with $250,000 capital by M. Cohn and S. Cohn. M. E. Leopin, 36 West Forty-fourth street, is attorney.

NEW YORK—Claroplate Process Inc. has been incorporated with $100,000 capital to manufacture printing machinery by D. C. Wyman, 120 Broadway, is attorney.

NEW YORK—Marnov Enamel Co. has been incorporated with $5000 capital to manufacture enamel ware by I Novick, S. Alkon and M. Ravitz. I Schleider, 154 Nassau street, is attorney.

NEW YORK—Complete Machinery & Equipment Co. has been incorporated with $30,000 capital by M. Rothschild, B. Share and I. Freilich. A. Wengrow, 1457 Broadway, is attorney.

NEW YORK.—Joshua Oldham Mfg. Co. has been incorporated with $100,000 capital to manufacture saws by D. M. Sarkisian, C. W. Ellis and G. Oldham. Metcalfe & Branch, 33 Rector street, are attorneys.

NEW YORK—Peoples Clamp Corp. has been incorporated with $50,000 capital to manufacture hose devices by M. J. O'Brien II, V. P. Ulhirn and W. Keaver. Rothwekk, Harper & Matthews, 2 Rector street, are attorneys.

NEW YORK—Herman C. Starck has been incorporated to manufacture metals, with 1000 shares common stock no par value by V. E. Whitlock, J. J. Dunn and S. Sharinn. Holm, Whitlock & Scarff, 222 Fulton street, are attorneys.

NEW YORK—L. Bulasky has been incorporated with 10,000 shares common stock no par value to manufacture hat and leather sewing machines by L. Bulasky, A. M. Wenzel and T. W. Hennessey. R. E. Moffett, 894 Broadway, is attorney.

NEW YORK—Donpro Trading Co. has been incorporated with 250 shares common stock no par value to manufacture metals by P. Donahue, S. L. Costello and H. Tracy. Duran, Bowen & Byrne, 81 Fulton street, is attorney.

NEW YORK—Bruckner Thermo Cycle Corp. has been incorporated with 900 class A and 100 class B shares both no par to manufacture motors by R. E. Bruckner, E. H. Ludeman and C. H. Ludeman. Toney & Hardy, 149 Broadway, are attorneys.

NEW YORK—Vendex has been incorporated with 1000 shares $100 each and 2000 common no par value to manufacture machinery by A. C. Heller, E. J. Willsey and W. W. Stephenson. Weibert, Paddock & Cochrane, 49 Wall street, are attorneys.

OLEAN, N. Y.—The Pennsylvania railroad is inquiring for steel for a shop addition here.

ROCHESTER, N. Y.—Consolidated Machine Tool Corp., A. H. Ingle manager, will build a 1-story addition to its plant at 565 Blossom road.

ROCHESTER, N. Y.—The Crane Co., Chicago, has started construction of an addition to its warehouse at South and Monroe avenues.

AKRON, O.—Akron Brass & Aluminum Co. has been incorporated with $500 capital by C. A. Baird, C. C. Gillooly, E. J. Barron, J. Molner and Gertrude Hanson.

CANTON, O.—Canton Ventilator Works Inc., 1549 Market avenue, S., has been incorporated to manufacture window ventilators by Henry J. Bowman, Madge Radtke, Olive M. Bowman, John R. Robley and Elizabeth G. Robley. J. A. Bowman, 104 Market street, is attorney.

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. works

Pennsylvania, No. 1	$43.00 to 46.00
Pennsylvania, No. 2	35.00 to 40.00
Ohio, No. 1	43.00 to 46.00
Ohio, No. 2	38.00 to 40.00
Illinois, No. 1	40.00 to 43.00
Illinois, No. 2	35.00 to 38.00
Kentucky, No. 1	43.00 to 45.00
Kentucky, No. 2	40.00 to 43.00
Missouri, No. 1	43.00 to 46.00
Missouri, No. 2	35.00 to 38.00
Maryland, No. 1	43.00 to 47.00
Maryland, No. 2	39.00 to 42.00

SILICA BRICK

Pennsylvania	40.00
Chicago	49.00
Birmingham	48.00 to 52.00

MAGNESITE BRICK

Per Net Ton Seaboard Base

9 x 4½ x 2½	65.00

CHROME BRICK

(Per Net Ton)

9 x 4½ x 2½	45.00 to 48.00

CLEVELAND—Cream Cone Machine Co., 5800 Hough avenue, J. W. Taylor president, will build a 4-story addition to its plant.

CLEVELAND—Northern Blower Co., West Sixty-fifth street and Barberton avenue, will build an addition 75x100 feet for experimental and testing departments. Further additions are planned to follow.

CLEVELAND—Cooling Methods Inc., has been incorporated to manufacture refrigerating, ventilating and heating machinery and devices by R. E. Westfall, Barton Griffith Jr., S. A. Senter, Anna Poffenbarger and K. Nowell. R. E. Westfall, Atlas building, Columbus, is attorney.

FOSTORIA, O.—Seneca Wire & Mfg. Co. will build a 1-story addition 160x375 feet for a new department.

SPRINGFIELD, O.—Mast-Foos Co., manufacturer of pumps, windmills and similar machinery, will rebuild its plant, recently burned.

TOLEDO, O.—American Can Co., J. E. Blank, superintendent, will build a 1-story addition 59x271 feet. A. Bentley & Co., 201 Belmont avenue, has the general contract.

YOUNGSTOWN, O.—United States Furnace Co., 624 Oak street, has been incorporated to manufacture warm air furnaces and sheet metal products by Edward J. Ludt, Joseph Hubert, Russell Walls, Mark M. Gunlefinger and B. F. Wirt. Wirt & Gunlefinger, Mahoning bank building, are attorneys.

ALVA, OKLA.—Alva Knife & Mfg. Co. has been incorporated with $10,000 capital to manufacture cutlery by Clarence C. Bittner and Joe Schnitzer.

OKLAHOMA CITY, OKLA.—Harris Tourist Bed Co., has been incorporated with $100,000 capital to manufacture folding metal beds by H. G. Jackson 333 West Ninth street.

McALESTER, OKLA.—C. C. Cooke Roofing & Steel Metal Co. has been incorporated with $10,000 capital by C. C. Cooke, C. E. Baumort and H. E. Kylor.

OSWEGO, OREG.—Defeat by the voters of a plan to buy the present water system from the Oregon Iron & Steel Co. means that the city will shortly construct its own system at a cost of about $100,000.

ALLENTOWN, PA.—Bonney Forge & Tool Works, manufacturer of wrenches, is building an addition 110 x 200 feet to increase its production capacity.

ALLENTOWN, PA.—The International Motors Corp. has awarded 2200 tons of structural steel for a body shop at its local plant to the McClintic-Marshall Co.

BANGOR, PA.—Flory-Deshler Mfg. Co. has been incorporated with $10,000 capital to manufacture hardware specialties by Levan B. Flory, Bangor, Harry H. Deshler and Roy Saeger.

BEAVER FALLS, PA.—Standard Steel Specialty Co. has been incorporated with $200,000 capital to manufacture steel specialties, machine keys, machine rack and planed steel products by Ernest J. Wagner, College Hill, Beaver Falls, J. Rankin Martin and L. M. Wgner.

CHESTER, PA.—A definite step toward the establishment of a large assembly plant here for the Ford Motor Co. has been taken in the issuance of an inquiry for structural steel.

ERIE, PA.—Erie Nut & Bolt Co. is building an addition to its plant at Twelfth and Liberty streets.

ERIE, PA.—Tanner Mfg. Co. has been incorporated with $25,000 capital to manufacture metal products by C. L. Bauer, 702 Plum street, Erie, A. A. Bauer, and Milton Rowley.

HARRISBURG, PA.—Eshenower & Hatmaker Machine Tool Works Inc. has been incorporated with $25,000 capital to operate a machine shop by Edwin E. Eshenower, 900 Norwood street, Harrisburg, Pa., William E. Hatmaker and Richard A. Coleman.

JEANETTE, PA.—G. M. Johnson Co. has been incorporated with $100,000 capital to manufacture mine cars and cages and appliances, tools, and equipment by P. J. Meehan, 3021 Bergman street, Pittsburgh, E. W. Wright and James V. Burke, Pittsburgh.

PHILADELPHIA—The Philadelphia Rubber Works, Land Title building, is inquiring for steel for a new plant addition.

PHILADELPHIA—Howard F. Graw, 3409 Melvale street, will start work at once upon a $10,000 plant addition.

PHILADELPHIA—W. Reisbond, 4442 Ludlow street, is building a 2-story structural steel fabricating shop 19x50 feet.

PHILADELPHIA—J. Hyman & Son, Livingston and Tioga streets, will build a 1-story shop and storage building 120x200 feet.

PHILADELPHIA—Work will be started shortly by Thomas F. Riley, Fiftieth street and City Line on a $30,000 warehouse addition.

PHILADELPHIA—Contract has been awarded to William F. Koelle Co., 2601 Oxford street, for $5000 plant alterations for J. F. Adams, 134-36 North Front street.

PHILADELPHIA—Shannon Metalcraft Corp. has been incorporated with $50,000 capital to manufacture metal products by Joseph F. Kerbaugh, Bryn Mawr, Pa., and Malcom D. Kerbaugh.

PHILADELPHIA—H. E. Wallace Co., 2514 Germantown avenue, has been incorporated with $5000 capital to manufacture electrical fixtures by Margaret B. Justice and Harry E. Wallace, Philadelphia and Albert J. Wallace, Collingswood, N. J.

PHILADELPHIA—Philadelphia Harley-Davidson Co., has been incorporated with $10,000 capital to manufacture motor vehicles and parts, by Ethel S. Drake, 4221 North

(*Continued on Page* 1695)

1925 Warehouse Totals Exceed 1924

Demand Good for Season and Prices Firm—1926 Prospects Good

DECEMBER was unusually active in point of warehouse sales, closing a year totaling considerably above 1924. Prospects for January tonnage are good, and increased activity is expected. Prices are firm and unchanged.

The month now closing has been unusually active in the New York metropolitan warehouse district. One large jobber asserts that the pre-holiday activity has been the best in at least ten years, and it is believed that the momentum will carry over into next year. In some quarters the market is expected to continue active for the first six months. It is believed that the railroads will be heavy buyers of rails during that period, and that this business will divert much ingot capacity that in recent months has gone into commercial channels. Prices are unchanged.

Warehouse price shading in the Philadelphia district is less pronounced but has not disappeared entirely The volume of sales continues good despite holiday interruption.

Fair business features the holiday trade of warehouses at Detroit. While orders have fallen off tonnage moved remains exceptional for this season. Warehouse operators are looking for a rush of orders shortly after the first of the year. Prices are firm and unchanged.

The final quarter of the year proved the best for Buffalo warehouses. Demand held up to substantial proportions. Prices are unchanged in this district.

With the inventory period on hand, a slackening influence has crept into the warehouse business at Cincinnati. Lack of important buying leaves prices unchanged and firm at prevailing schedules.

Cleveland jobbers report but slight slackening from the warehouse buying rate. December will total nearly as high as November. Prices are unchanged and shading is less in evidence.

St. Louis warehouse business continues above the seasonal average, and prices are holding firm. Shading, complained of at some other centers, has not appeared here.

Stutz Fire Engine Co., Indianapolis, Ind., has reduced its common stock from $500,000 to $70,075.

Quotations at Cents Per Pound at Leading Market Centers

STEEL BARS

Boston	3.265c
Buffalo	3.30c
Chicago	3.00c
Cincinnati	3.30c
Cleveland	3.10c
Detroit	3.15c
Los Angeles	3.05c
New York	3.24c
Philadelphia	3.00c to 3.20c
Pittsburgh	2.90c
Portland	2.85c
San Francisco	3.30c
Seattle	3.25c
St. Louis	3.15c
St. Paul	3.25c

IRON BARS

Boston	3.265c
Buffalo	3.30c
Chicago	3.00c
Cincinnati	3.30c
Detroit	3.15c
New York	3.24c
Philadelphia	3.05c to 3.20c
St. Louis	3.25c

REINFORCING BARS

Boston	3.265c to 3.50c
Buffalo	3.30c
Chicago, billet	2.60c
Chicago, rail steel	2.00c to 2.10c
Cincinnati	3.30c
Cleveland	2.85c to 3.10c
Detroit	3.15c
Los Angeles, C. L.	3.05c
Los Angeles, L. C. L.	3.30c
New York	2.95c to 3.15c
Philadelphia	3.00c to 3.25c
Pittsburgh	2.50c to 2.60c
San Francisco, C. L.	3.35c
San Francisco, L. C. L.	3.80c
Seattle	3.50c
Youngstown	2.50c

STANDARD STRUCTURAL SHAPES

Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.40c
Cleveland	3.20c
Detroit	3.25c
Los Angeles	3.05c
New York	3.34c
Philadelphia	2.60c to 3.20c
Pittsburgh	3.00c
Portland	2.85c
San Francisco	3.30c
Seattle	3.35c
St. Louis	3.25c
St. Paul	3.35c

PLATES

Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.40c
Cleveland, ¼-inch and thicker	3.20c
Cleveland, 3/16-inch	3.425c
Detroit	3.25c
Detroit, 3/16-inch	3.45c
Los Angeles	3.15c
New York	3.34c
Philadelphia	2.60c to 3.20c
Philadelphia, 3/16-inch	2.80c to 3.40c
Pittsburgh	3.00c
Portland	3.25c
San Francisco	3.30c
Seattle	3.25c
St. Louis	3.25c
St. Paul	3.35c

NO. 10 BLUE ANNEALED SHEETS

Boston, 3/16-inch	3.915c
Buffalo	3.90c
Chicago	3.50c
Cincinnati	3.60c
Cleveland	3.15c
Detroit	3.65c
Los Angeles	3.70c
New York	3.89c
Portland	4.25c
Philadelphia	3.20c to 3.50c
San Francisco	3.75c
Seattle	4.50c
St. Louis	3.65c
St. Paul	3.75c

NO. 28 BLACK SHEETS

Boston	5.25c
Buffalo	4.60c
Chicago	4.10c
Cincinnati	4.55c
Cleveland	3.95c
Detroit	4.25c
Los Angeles	4.75c
New York	4.35c
Philadelphia	4.65c
Portland	5.50c
San Francisco	4.75c
Seattle	5.50c
St. Louis	4.60c
St. Paul	4.35c

NO. 28 GALVANIZED SHEETS

Boston	6.25c
Buffalo	5.90c
Chicago	5.25c
Cincinnati	5.65c
Cleveland	5.10c
Detroit	5.50c
Los Angeles (corr. 28 ga.)	6.00c
New York	5.50c
Philadelphia	5.85c
Portland	6.25c
San Francisco	6.00c
Seattle	6.50c
St. Louis	5.70c
St. Paul	5.50c

BANDS

Boston	4.015c
Buffalo	4.05c
Chicago	3.65c
Cincinnati	3.95c
Cleveland	3.85c
Detroit	3.80c
Los Angeles	3.90c
New York	3.99c
Philadelphia	3.75c to 3.90c
Pittsburgh	3.60c
Portland	4.25c
San Francisco	4.15c
Seattle	4.25c
St. Paul	3.90c

HOOPS

Boston	5.50c
Buffalo	4.05c
Chicago	4.15c
Cleveland	3.85c
Detroit	4.30c
New York	4.49c
Philadelphia	4.10c to 4.25c
Pittsburgh	3.60c
Seattle	5.00c
St. Paul	4.40c

COLD FINISHED STEEL

	Rounds and hexagons	Flats and squares
Boston	4.05c	4.55c
Buffalo	3.95c	4.45c
Chicago	3.60c	4.10c
Cincinnati	3.85c	4.35c
Cleveland	3.90c	4.40c
Detroit	3.85c	4.25c
Los Angeles	5.25c*	.....
New York	4.00c	4.50c
Philadelphia	4.00c	4.50c
Pittsburgh	3.60c	4.10c
Portland	5.00c*	.....
San Francisco	3.75c*	.....
Seattle	5.00c*	.....
St. Paul	3.85c	.....

*Rounds only.

COLD ROLLED STRIP

Boston, .100 inch, 500 lb. lots	6.30c
Buffalo	6.35c
Chicago	6.25c
Cincinnati	7.15c
Cleveland, over 500 pound lots	5.95c
Detroit	6.20c
New York	6.25c
Philadelphia	6.25c
Pittsburgh	6.30c

FOREIGN IRON AND STEEL
New York, duty paid

Swedish hollow drill steel	15.00c
Swedish iron bars round	6.75c
Flats and squares	7.00c

WELDED PIPE
Discounts from warehouse. New York City

Standard Steel Pipe

WROUGHT STEEL PIPE

	Black	Galvanized
⅛-inch butt	—28	+21
¼ to ⅜-inch butt	—36	— 3
½-inch butt	—46	—29
¾-inch butt	—51	—37
1 to 3-inch butt	—53	—39
2-inch lap	—40	—22
2½ to 6 inch lap	—48	—35
7 and 8-inch lap	—44	—17
9 and 10-inch lap	—38	—14
11 and 12-inch lap	—37	—12

WROUGHT IRON PIPE

	Black	Galvanized
¼ to ⅜-inch butt	+44%	+78%
½-inch butt	— 4	+19
¾-inch butt	—11	+ 9
1 to 1½-inch butt	—14	+ 6
2-inch lap	— 5	+14
2½-inch lap	— 9	+ 9
3 to 6-inch lap	— 3	+ 6
7 to 12-inch lap	— 3	+16

Iron and Manganese Ores and Minerals

Iron Ore

LAKE SUPERIOR ORES

Per Gross Ton Lower Lake Ports

Old range bessemer, 51½ per cent iron	$4.55
Mesabi bessemer, 51½ per cent iron	4.40
Old Range nonbessemer, 51½ per cent iron	4.40
Mesabi nonbessemer, 51½ per cent iron	4.25

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic 53 to 63 per cent	9.00 to 10.00
Copper free low phosphorus 53 to 65 per cent	nominal

FOREIGN IRON ORE

Cents per unit, f.o.b. cars Atlantic ports

Spanish low phosphorus, 52 to 54 per cent	9.00 to 10.00
Algerian low phosphorus, 52 to 54 per cent	9.75 to 10.00
Riff low phosphorus, 65 to 66 per cent	9.50 to 10.00
Swedish and Norwegian low phosphorus, 68 per cent	11.00 to 11.50
Swedish foundry or basic, 66 to 68 per cent	9.00 to 10.00
Spanish foundry or basic, 50 to 54 per cent	8.50 to 9.00
Algerian foundry and basic, 50 to 54 per cent	8.50 to 9.00

Manganese Ore

Prices do not include duty at rate of 1 cent per pound of metallic manganese contained.

Brazilian, minimum 47 per cent.....nominal
Indian minimum 47 per cent.....nominal
Caucasian, 53 to 55 per cent.....
....Washed, 41 to 43 cents c.i.f. tidewater

Fluor Spar

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton	$17.50
Washed gravel, imported duty paid eastern tidewater, per net ton	17.00 to 18.00

Construction and Enterprise

(*Continued from Page* 1693)

Franklin street, Philadelphia, Henry Slater, Donald Helffrich and Carl W. Bush.

PHILADELPHIA—Federal Metal Products Co. has been incorporated with $40,000 capital to manufacture metal castings and other metal products by George G. Kelley, 206 North Franklin street, Anton S. Simsack and Henry M. W. Smyth.

PITTSBURGH—Frank Wilson Co. has been incorporated with $50,000 capital to manufacture electrical devices by Frank Wilson, Baum boulevard and Melwood street, Pittsburgh, W. H. Beck, Wilbur F. Galbraith.

PITTSBURGH—Commercial Brass Foundry Co. has been incorporated with $5000 capital to build and operate a nonferrous foundry by C. F. C. Arensberg, Pittsburgh, James M Graham and John Heron.

PITTSBURGH—Stupakoff Laboratories Inc. has been incorporated with $5000 capital to manufacture instruments, apparatus and equipment for scientific use by Simon H. Stupakoff, 6713 McPherson street, Wilhelmina Stupakoff and Semon H. Stupakoff.

PITTSBURGH—Watkins Babbitting Service of Pittsburgh has been incorporated with $10,000 capital to manufacture bearings and engine parts by E. B. Rhodes, 1934 Chislett street, Pittsburgh, H. A. Socher and Robert R. Werle.

PITTSBURGH—Equitable Meter & Mfg. Co. has been incorporated with $5000 capital to manufacture meters, valves, regulators and similar appliances by Meredyth H. Ewing, 245 Melwood street, Lawrence D. Blair and James H. Bovard.

WARREN, PA.—DeLuxe Metal Furniture Co. is being formed with H. P. Stone, financial manager and H. J. Onions business manager, to engage in the manufacture of metal office furniture, metal doors and inside trim. It will occupy the former plant of the Gisholt Machine Co., with an acre of floor space on a five acre tract.

WILKES BARRE, PA.—Briquette Fuel Corp. has been incorporated with $50,000 capital to manufacture briquette-making machinery and parts by J. A. Briggs, 127 Academy street, H. E. Chase and Mulford Morris.

CHATTANOOGA, TENN.—Corley Mfg. Co., Williams and Nineteenth streets, has let contract to Buener & Cannon, Frazier street, for three buildings, 90x200 feet, 30x60 feet and 40x50 feet.

KNOXVILLE, TENN.—The Southern railway has placed steel with the Bethlehem Steel Co. for a planing mill here.

ONEIDA, TENN.—Oneida Machinery Co. is rebuilding its burned plant.

HOUSTON, TEX.—Layne & Bowler Co. has been incorporated with $300,000 capital to manufacture well machinery by O. P. Woodburn, 847 Boulevard street.

PUGET SOUND NAVY YARD, WASH.—Navy supply officer on Jan. 2, will open bids for furnishing one compressor, air, electric driven, complete with motor, air control valve, etc.

SEATTLE—Cove Mfg. Co. has been incorporated with $2000 capital to manufacture products of sheet metal by A. G. Valbusch, and E. F. Sylvenic.

SPOKANE, WASH.—Purchase of the Holt Mfg. Co. building, South 121 Lincoln street, by Mitchell, Lewis & Staver Co. is announced.

SPOKANE, WASH.—Plans have been announced for the construction here of a $100,000 plant for manufacturing snap hooks, cat-

Industrial Business Changes

LONDON MOTOR PLOW CO., Springfield, O., has changed its name to London Motor Plow Power Lift Co.

* * *

Toledo Scale Co. is planning to establish a branch at Birmingham, Ala., in charge of P. Hicks Cadle.

* * *

Lewis Coal & Coke Co. Inc., Westfield, N. Y., announces the opening Jan. 1 of a wholesale department handling metallurgical and domestic coke and coal.

* * *

Link-Belt Co., Chicago, has opened a branch office in the First Wisconsin National Bank building, Milwaukee, in charge of R. C. Kendall.

* * *

Climax Engineering Co., Clinton, Iowa., has appointed F. M. McLaughlin to represent it in eastern territory, with offices at 30 East Forty-second street, New York.

* * *

Drier Iron Works, New York, has bought the property of the Todd Shipbuilding Co., Twelfth street and Avenue A, and is refitting it as a steel fabricating shop.

* * *

Rotary Mfg. Co., Los Angeles, will move shortly into its new plant at 5718 Long Beach avenue, where much larger facilities are available for the production of heating appliances.

* * *

Whiton Hardware Co., a pioneer jobbing firm at Seattle, will retire from business Dec. 31, selling its stock and business to the Seattle Hardware Co., Schwabacker Hardware Co. and the Marshall-Wells Co.

tle guards and other iron products by the Frechette Two-in-One Snap Hook Co., of Nelson, B. C.

SPOKANE, WASH.—Frechette Two-in-One Snap Hook Co., Nelson, B. C., A. A. Frechette general manager, plans a plant here to manufacture snap hooks, cattle guards and other iron products. Frank C. Bailey, secretary Northwest Mining association, Spokane, is interested.

WHEELING, W. VA.—Wheeling Machine Products Co., E. W. Krause general manager, 1920 Main street, will build addition and install forging and automatic screw machines to increase daily capacity to 100,000 pipe connections.

ASHLAND, WIS.—Chicago & Northwestern railroad has awarded contract to Peppard & Fulton, Minneapolis, Minn., to rebuild, repair and enlarge No. 1 ore dock.

KENOSHA, WIS.—Kenosha Specialty Brass Co. has bought one of the factory buildings of the Winther Motor Co., 60x400 feet, and will remodel and equip it for its purposes, removing its foundry first and other departments later.

MADISON, WIS.—Burgess Battery Co. has bought No. 2 plant of the Moline Plow Co., Freeport, Ill., for a branch plant for the manufacture of dry batteries.

MENASHA, WIS.—Tayco Register Shield has been organized to manufacture metal shields for heating radiators, by C. M. Crawford and associates. The former plant of the Kelville Paper Co. has been leased and is being remodeled and re-equipped.

MILWAUKEE—Val Blatz Brewing Co., Frank M. Gabel secretary and treasurer, will build a garage 56x156 feet, Juneau avenue and Broadway.

MILWAUKEE—A. J. Lindeman & Hooverson Co. will build an additional shop building with about 8000 square feet. Klug & Smith architects and engineers.

MILWAUKEE—Master Lock Co., O. E. Yolles president, 78 West Water street, has bought a site for a plant at Lake and Pierce streets and will build in 1926.

MILWAUKEE—Robert L. Reisinger & Co., 454 Oakland avenue, have taken the general contract to build a $100,000 garage, 120 x 143 feet, for George W. Boller, 370 Brady street, at 284-288 Farwell avenue, Milwaukee.

MILWAUKEE—E. R. Liebert, 419 Oneida street, architect, is taking bids for a factory, office and engine room for unnamed client, 3-story 40 x 100 feet, 2-story 50 x 60 feet and 3-story 50 x 120 feet.

MILWAUKEE—H. Schmitt & Son, Inc., 430 Farwell avenue, have taken the general contract to erect a $50,000 automotive building at Prospect avenue and Kenilworth place for the Waltzer & Kern Co., Chrysler dealer.

MILWAUKEE—R. W. Z. Specialty Corp. has been incorporated with $10,000 capital to manufacture automobile accessories, equipment and parts, and die stamping and machine products by William Reid, Roy Webb and A. H. Zancig.

MILWAUKEE — Milwaukee Metropolitan Sewage commission is taking bids on complete equipment for the Mud creek low level sewage booster station, including two 5000-gallon centrifugal pumps, motor driven. John H. Fowles is secretary of the commission.

MILWAUKEE—The Kroening Construction Co., Milwaukee, is lowest bidder for the general contract for erecting the new Kosciusko pre-vocational school on Windlake and Fifth avenues, Milwaukee, to cost about $400,000 complete.

MILWAUKEE—The Plastic Products Co. has approved plans by Architect A. L. Seidenschwartz, 290 Third street, for a complete new plant, 76 x 200 feet, part 2-story, on Port Washington road. The present plant at 123 Reservoir avenue will be sold.

MILWAUKEE—More than $100,000 will be spent by the A. F. Meckelburg Sash & Door Co., Thirty-first and Elm streets, in additional buildings and machinery, including motors, power plant apparatus and servicing equipment. The work is in charge of Klug & Smith, 69 Wisconsin street, Milwaukee.

MILWAUKEE—City of Milwaukee will spend $400,000 enlarging its pumping station Ferrace and North avenues, including boiler room 60 x 176 feet, stack 200 feet high, machine shop with 5 or 10-ton crane and boilers with automatic stokers. Joseph Schwada is city engineer.

MILWAUKEE—Cahill & Douglas, consulting engineers, 217 West Water street, are in charge of an extensive plant reconstruction and enlargement program of the Red Star Yeast & Products Co. at Twenty-seventh street viaduct. The power house will be enlarged by a 2-story addition, 50 x 70 feet, with new equipment. A 3-story plant addition, 53 x 120 feet, and a new office and warehouse, 40 x 100 feet, will be built as well. The total cost of the work will be in the neighborhood of $150,000.

STETSONVILLE, WIS.—Northern States Power Co., 15 South Fifth street, Minneapolis, Minn., will build high line between Stetsonville and Dorchester.

STEVENS, POINT, WIS.—The Worthington Pump & Machinery Corp. is successful bidder for the pumping machinery required for a large extension of the local plant of the Consolidated Water Power & Paper Co., which has headquarters at Wisconsin Rapids, Wis. The entire work will cost about $75,000.

Business in Canada

BURNABY, B. C.—Plans are being prepared by Ernest Smith for $30,000 addition to waterworks plant here.

WINNIPEG, MAN.—It is reported that the taking over and subsequent development of the Flin Flon copper mine in Northern Manitoba will represent an expenditure of approximately $24,000,000. The purchase of the mine by the H. P. Whitney interests will involve the construction of a railway at a cost of approximately $2,000,000. According to recent plans the undertaking will include the construction of a smelter plant with equipment capable of handling 4000 tons of ore per day.

BARTON TOWNSHIP, ONT.—The township council will submit a by-law to ratepayers to pass on the installation of waterworks plant and system here at a cost of $325,000. James, Proctor & Redfern, Ltd., Excelsior Life building, Toronto, Ont., are engineers.

COLLINGWOOD, ONT.—The Huronia Steel Co., Ltd., J. A. Currie, Bay street, Toronto, Ont., president, will purchase equipment for plant recently taken over here for the manufacture of automobile castings, stainless steel, etc.

KINGSVILLE, ONT.—G. Hall will purchase complete equipment including lathe, small tools, etc., for $50,000 garage here.

PORT COLBORNE, ONT.—The International Nickel Co., contemplates building addition to plant here.

PORT HOPE, ONT.—The Port Hope Sanitary Mfg. Co. will build addition to plant here.

SANDWICH, ONT.—The Canadian Salt Co. Ltd., Sandwich street, will build addition to plant on waterfront.

TORONTO, ONT.—The Canadian General Electric Co., 212 King street west, has awarded contract to Anglin, Norcross, Ltd., Temple building, for addition to power house at corner of Ward and Wallace streets.

BELANGER SIDING, QUE.—A. J. Morin will purchase jig saw, planer, and other woodworking tools.

MONTREAL, QUE.—W. Charest, 324 Marie Anne street, will award contracts in connection with $200,000 garage here.

MONTREAL, QUE.—The Garage Marcotte, 1861 Bordeaut street, A. Marcotte, purchasing agent, is in the market for small lathe, miscellaneous tools, etc.

New Trade Publications

BALL VALVES—Forged and cast ball valves are described in a bulletin by the Wilson-Snyder Co., Pittsburgh. It is illustrated by diagrams and engineering data are presented.

AIR COMPRESSORS—Pennsylvania Pump & Compressor Co., Easton, Pa., is issuing a bulletin describing its two-stage cross compound compressors with ample illustration and description of construction and operation, photographs of installations and engineering data.

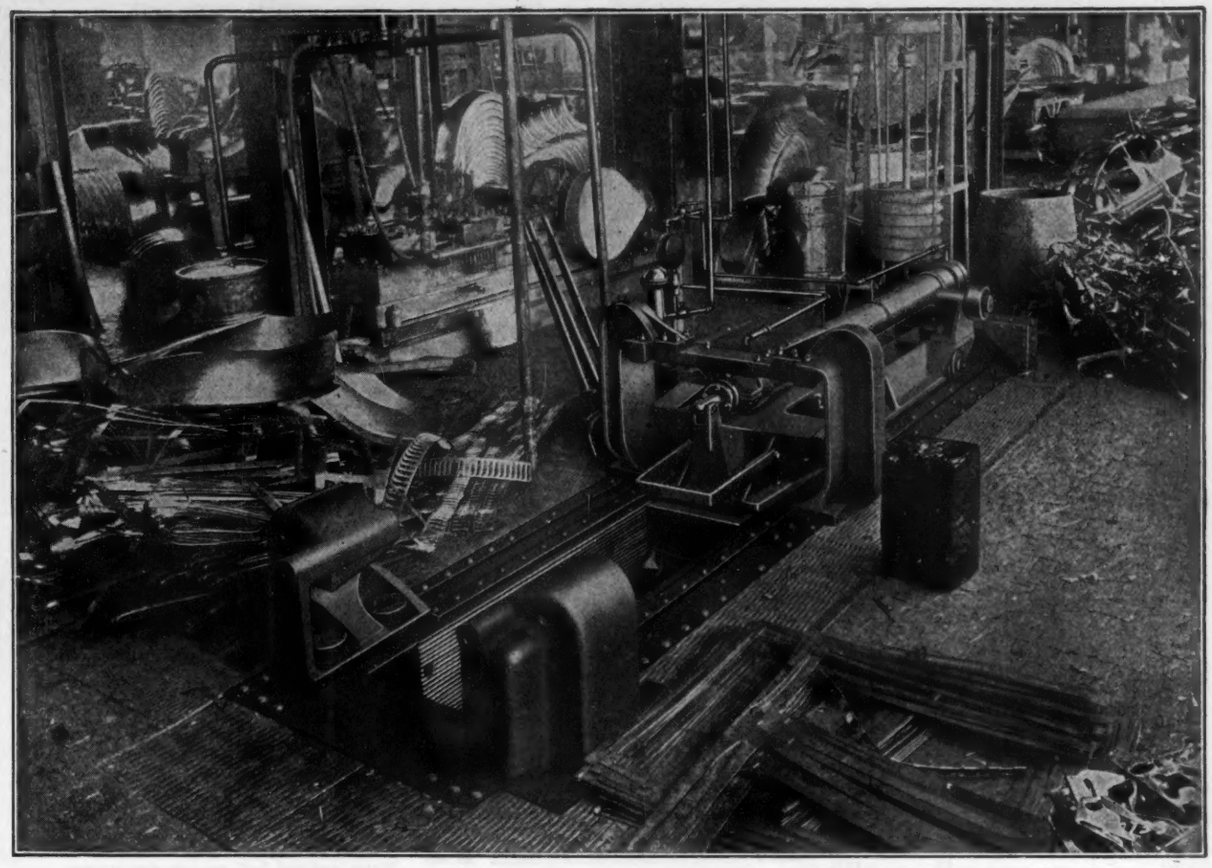
INDUSTRIAL CONTROL—A catalog covering representative lines of industrial control apparatus manufactured by the General Electric Co., Schenectady, N. Y., has been issued by that company. It includes a reprint of the industrial control section of the company's general catalog and instructive matter on the care and operation of control devices, wiring diagrams of standard controllers, push buttons and other accessories, reference tables, lists of publications and other information. It contains 160 pages.

BEARING METAL—Its bronze bearing metal is the subject of a booklet by the Cored Bar Corp., Buffalo, N. Y. The composition of the metal, its uses, physical composition and tests are given and microphotographs show its structure.

TESTING MACHINES—Riehle Bros. Testing Machine Co., Philadelphia, has issued a new catalog in loose leaf form, covering their line of testing machines and equipment including late developments in the fields of cement, steel, wire, concrete and other materials.

FIRE EXTINGUISHER — Bastian-Blessing Co., Chicago, has issued a folder describing its type of portable extinguisher by which compressed carbonic acid gas is used to spray a powder on the flame, by which more of the gas is generated and the fire stopped. It is well illustrated.

ELECTRIC EQUIPMENT—A catalog of 1100 pages has been issued by the General Electric Co., Schenectady, N. Y., superseding all previous catalogs and covering the entire line of the company's products. It is indexed into 16 divisions and products are classified both by subjects and catalog number.



Typical Installation in Well-Known Automobile Plant

WHY SHEET-SCRAP CAN BE PROFITABLY COMPRESSED

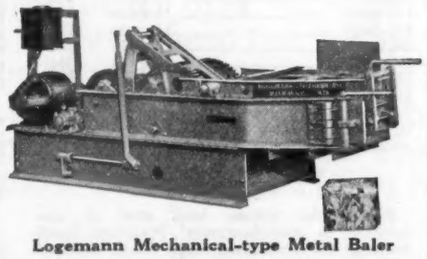
It commands at all times the best price;
It can be more conveniently stored;
It can be more economically handled;
It can be readily held for favorable markets;
It practically eliminates corrosion;
It permits of loading cars to capacity;
It saves much heat in remelting.

LOGEMANN SCRAP-METAL PRESSES

Hydraulic and Mechanical Types

LOGEMANN BROTHERS COMPANY
3126 Burleigh St. Milwaukee, Wis.

Also presses making crucible-size bricks of copper, brass, aluminum and other metals.



Logemann Mechanical-type Metal Baler

Please indicate character of scrap, quantity and heaviest gauge, when writing.

Discounts and Extras

Steel Pipe

Pittsburgh and Lorain basing discounts, jobber's carloads.

Evanston, Ill., and Indiana Harbor, Ind., take differential 2 points less discount or $4 per ton higher net.

Chicago takes differential 2½ points less than Pittsburgh-Lorain basis or $5 per ton higher net.

Butt Weld

	Black	Galvanized
⅛-inch	45	19½
¼ and ⅜-inch	51	26½
½-inch	46	42½
¾-inch	60	48½
1 to 3-inch	62	50½

Lap Weld

2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½

REAMED AND DRIFTED

Butt Weld

1 to 3-inch	60	48½

Lap Weld

2-inch	53	41½
2½ to 6-inch	57	45½

EXTRA STRONG—PLAIN ENDS

Butt Weld

⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½

Lap Weld

2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½

DOUBLE EXTRA STRONG

Butt Weld

½-inch	42	12½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½

Lap Weld

2-inch	41	32½
2½ to 4-inch	43	34½
4½ to 6-inch	42	33½
7 to 8-inch	33	25½

(Note—Large jobbers obtain additional preferential discounts of 1 and 5 on black and 1½ and 5 on galvanized.)

Wrought Iron Pipe

Pittsburgh basing discounts, jobbers' carloads. Individual quotations made on delivered basis

THREADS AND COUPLINGS

Butt Weld

¼ and ⅜-inch	+11	+39
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13

Lap Weld

1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 6-inch	26	11
8 to 6-inch	28	13
7 to 12-inch	26	11

PLUGGED AND REAMED

Two points less than above

EXTRA STRONG, PLAIN ENDS

¼ and ⅜-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14

Lap Weld

2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2

DOUBLE EXTRA STRONG

Butt Weld

½-inch	+47½	+59½
½-inch	+28	+40
1-inch	+34	+40
1¼-inch	+28	+40
1½-inch	+27	+39

Lap Weld

2 and 2½ inches	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	

(Note—Large jobbers obtain additional preferential discounts of 1, 5 and 2½ on black and galvanized.)

Boiler Tubes

Pittsburgh less carload discounts. Carload 4 points larger

STEEL (Lap Welded)

2 and 2¼-inch	28 off
2½ and 2¾-inch	33 off
3-inch	36 off
4⅛ to 3⅝-inch	38½ off
4 to 13-inch	42 off

(Note—Additional discounts of 5 to 7 extra 5 per cents now being given.)

CHARCOAL IRON

1½-inch	+22
1⅝-inch	+12
2 and 2¼-inch	+ 2
2½ to 3-inch	3
3¼ to 4½-inch	5

(Note—Additional discounts of 2 or 3 extra 5 per cents now being given.)

SEAMLESS COLD DRAWN

1-inch	56 off
1¼ and 1½-inch	48 off
1¾-inch	32 off
2 and 2¼-inch	27 off
2½ and 2¾-inch	35 off
3-inch	41 off
3¼ and 3½-inch	43 off
4-inch	46 off
4½, 5 and 6-inch	41 off

SEAMLESS HOT ROLLED

2 and 2½-inch	30 off
2½ and 2¾-inch	38 off
3-inch	44 off
3¼ and 3½-inch	46 off
4-inch	49 off
4½, 5 and 6-inch	44 off

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts on New List July 1, 1925
Carbon 0.10 to 0.20 per cent.....50 to 55 off
Carbon 0.30 to 0.40 per cent.....45 to 50 off

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES

Net prices per foot f.o.b. Pittsburgh

Outside diameter	Gage	Price
2-inch	12-gage	14¼c
2-inch	11-gage	15c
2-inch	10-gage	16c
2¼-inch	12-gage	16c
2¼-inch	11-gage	17c
2¼-inch	10-gage	18c
3-inch	7-gage	33c
5⅝-inch	9-gage	50c
5½-inch	9-gage	52c

Plus usual extras for forming and for long lengths over 18 feet and for commercially exact lengths.

Plate Extras

BASE

Rectangular plates, tank steel or conforming to manufacturers' Standard Specifications for structural steel, dated Nov. 24, 1922, or equivalent, ¼-inch thick and over on thinnest edge, (except for ¼-inch or 72 inches wide when ordered to weight in pounds per square foot—see width and gage extras), 100 inches wide and under, down to but not including 6 inches wide, 5 feet 0 inches long up to published limit in length but not over 80 feet 0 inch, are base. Extras per Pound for Width or Diameter.

All Plates, Rectangular or Otherwise

¼-inch thick and heavier, but not less than 11 pounds per square foot, if ordered to weigh—

Over 100 inches to and including 110 inches	.05c
Over 110 inches to and including 115 inches	10c
Over 115 inches to and including 120 inches	.15c
Over 120 inches to and including 125 inches	25c
Over 125 inches to and including 128 inches	.50c
Plates less than ¼-inch or lighter than 11 pounds per square foot.	
Over 72 inches to and including 84 inches	10c
Over 84 inches to and including 96 inches	.20c
Over 96 inches to and including 100 inches	.30c

Over 100 inches add .35c to width extras for plates ¼ inch thick and heavier.

GAGE

Plates not Exceeding 72 inches Wide

Plates less than ¼-inch gage, to and including $\frac{7}{32}$-inch; or lighter than 10.2 pounds per square foot to and including 7.65 pounds per square foot 20c

Plates Over 72 inches Wide

Plates less than ¼-inch gage, to and including $\frac{7}{32}$-inch; or lighter than 11 pounds per square foot, to but not including 7.65 pounds per square foot ..... .20c

Plates ordered 7.65 pounds per square foot ..... .30c

QUALITIES

Pressing steel	.10c
Flange steel (boiler grade)	.15c
Ordinary firebox steel	.20c
Stillbottom steel	.30c
Locomotive firebox steel	.50c
Marine steel	1.50c
Hull material subject to U. S. Navy Dept. Specifications for Medium or Soft Steel	.10c
High tensile hull steel subject to U. S. Navy Dept., or equivalent specifications	1.00c
Boiler steel subject to U. S. Navy Dept. Specifications, classes A and B	1.50c

Hull plates to hull specifications, required to stand cold flanging, take extra for flange steel.

Floor Plates

Checkered plates 1.75c

Checkered plates are not furnished to sketch and are rolled from "Stock Steel" only. No physical tests will be made on checkered plates.

INSPECTION

Mill inspection ..... No extra

Charges for other inspection, such as Lloyd's or American bureau of shipping, will be made by inspection bureau direct to buyer.

CUTTING

LENGTH or DIAMETER

All Plates, Rectangular or Otherwise

Five feet and over up to published limit of length, but not over 80 feet.....No extras

Under 5 feet to 3 feet inclusive	10c
Under 3 feet to 2 feet inclusive	.25c
Under 2 feet to 1 foot inclusive	.50c
Under 1 foot	1.55c
Over 80 feet to 100 feet inclusive	.25c

Over 100 feet add .25c plus .05c for every additional 2 feet or fraction thereof.

Regular Sketches

With not more than four straight cuts (including straight taper plates)

Additional extra ..... .10c

Irregular Sketches

With not more than four straight cuts. (Sketches cannot be sheared with re-entrant angles)

Additional extra 20c

Globe Polished
and
Blue Chip
High Speed
DRILL RODS
Quality Accuracy
Uniformity

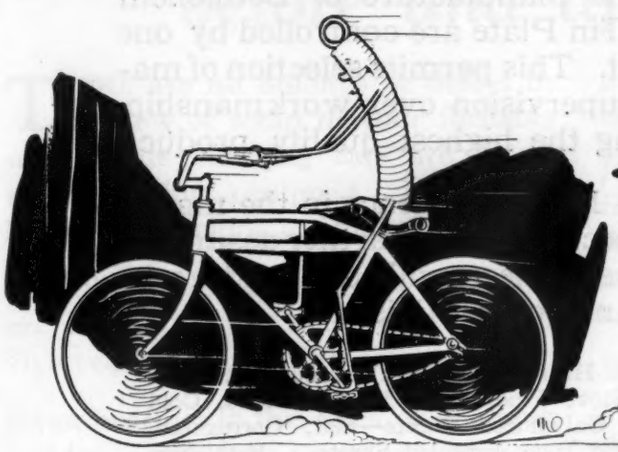
FIRTH-STERLING
STEEL COMPANY
McKeesport, Pa.

NEW YORK BOSTON HARTFORD PHILADELPHIA
CHICAGO CLEVELAND DETROIT
SAN FRANCISCO LOS ANGELES

W-11

HAGAN UNDERFEED
STOKER FIRED
FURNACES

George J. Hagan Company
Chamber of Commerce Bldg.
Pittsburgh, Pa.



Eddie Bought a Bike!

Eddie Extension Limber is no dead one. You can always depend on him to do a little better than you expect. This summer he wanted a "bike". Just a cheap one for vacation time. He worked all summer on an auto. And he got in a lot of overtime. Now he owns the best "bike" in the neighborhood. Yessir! You can depend on Eddie Extension Limber to uphold the reputation of the Limber family from Holly, Michigan.

American Spring & Manufacturing Corp.
ELM STREET, HOLLY, MICH.

Shipping Department of Bethlehem Tin Plate Mill

Assurance of Quality

All steel making and rolling operations involved in the manufacture of Bethlehem Sheets and Tin Plate are controlled by one management. This permits selection of materials and supervision over workmanship, thus assuring the highest quality product.

BETHLEHEM

A Sign of Quality

Bethlehem's long experience in the manufacture of special steels is further assurance that Bethlehem Sheets will be of good working quality and correct finish.

A partial list of Bethlehem Open Hearth Sheet Steel Products includes: Black Sheets including Blued Stove Pipe, De-oxidized, Pickled, Cold Rolled and Annealed Grades; Galvanized Sheets—Flat, Corrugated, V-Crimped and Roll Roofing; and Blue Annealed Sheets. Bethlehem also manufactures Bethlehem Coke Tin Plate and special finishes of Tin Mill Black Plate.

All These Products Manufactured from Open Hearth Steel

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

District Offices:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo
Cleveland Detroit Cincinnati Chicago St. Louis San Francisco Seattle Los Angeles

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM

A Steady Flow of Materials
before and after melting

THERE are no holdups or delays in the flow of scrap to your furnaces when your charging cars are Hyatt roller bearing equipped. No breaks because of sticking or clogged bearings.

With like steadiness and speed the ingots are carried to the soaking pits when Hyatt equipped ingot cars are on the job.

Hyatt bearings in the axles of charging and ingot cars make a reduction of from 50% to 80% in the high starting and draw-bar pull present with plain bearings. The enclosed mountings keep dust, scale and water out. With Hyatt roller bearings lubrication is infrequent—and there is no oil leakage.

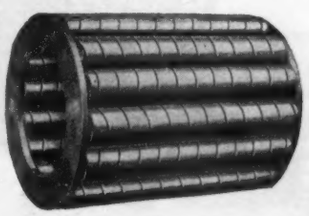
In all types of steel mill equipment where friction constantly endangers production, rugged, durable Hyatt roller bearings safeguard the points of hardest wear.

Prepare to meet the increasing demands for decreased costs by installing these bearings in old equipment and specifying them for new.

HYATT ROLLER BEARING COMPANY

NEWARK DETROIT CHICAGO SAN FRANCISCO
WORCESTER PHILADELPHIA CHARLOTTE
PITTSBURGH CLEVELAND

HYATT
ROLLER BEARINGS



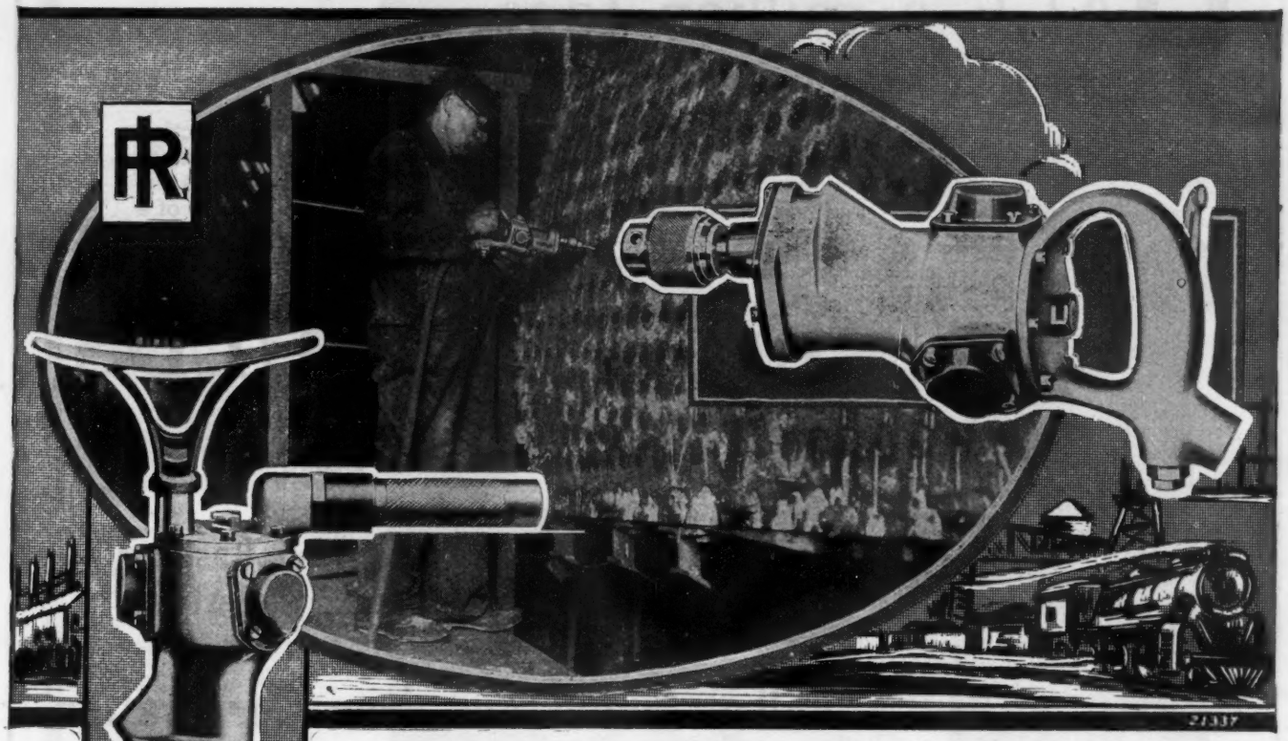
In logging camps and automobile factories in mines and steel plants you will find the oxy-acetylene torch at work with

Prest-O-Lite
DISSOLVED ACETYLENE

THE PREST-O-LITE COMPANY, INC.
Oxy-Acetylene Division
General Offices: Carbide and Carbon Bldg., 30 East 42d St., New York
In Canada: Prest-O-Lite Co. of Canada, Limited, Toronto
31 Plants—71 Warehouses—22 District Sales Offices

A Prest-O-Lite PRODUCT
WORLD'S LARGEST MANUFACTURER OF ACETYLENE "THE GAS OF A THOUSAND USES"
BATTERIES FOR AUTOMOBILES, FARM LIGHTING, RAILWAY SIGNALS AND RADIO

I-R three-cylinder pneumatic drills

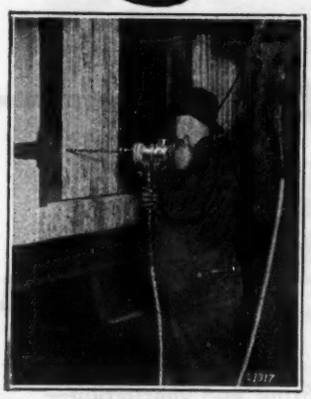


Drilling tell-tale holes with Size 6 drill shown above. This drill fitted with breast plate is shown at left.

Machines Without Equal for Light Drilling and Reaming

These Are the Features:

Freedom from vibration
Power and light weight
Low air consumption per brake horsepower
Few parts—all easily accessible
Low maintenance cost



Size DD Wood Borer in use on box car work

The construction of these machines has been found particularly suited to railroad work. They are used for all manner of small drilling, reaming, tapping, woodboring, etc.

These three-cylinder machines are available in six sizes, including reversible and non-reversible types. Sizes 6, 600, D, and DD are high speed machines used for drilling holes of ½" diameter and less and woodboring holes of 1" diameter and less. Sizes DE and DDE are lower-speed types and are adapted for heavier work. Ask for complete information.

INGERSOLL-RAND COMPANY-11 BROADWAY, NEW YORK CITY.

Offices in principal cities the world over

FOR CANADA REFER-CANADIAN INGERSOLL-RAND CO. LIMITED, 260 ST. JAMES STREET, MONTREAL, QUEBEC.

354PT

Ingersoll-Rand

HALF a million tons per year.

That's our capacity. Consider what such production means when you need moulds in an emergency. We are always able to meet your requests promptly. This service assures you uninterrupted production because of a continuous supply of moulds. *We are the largest manufacturers of Ingot Moulds in the world.*

INGOT MOULDS

Direct or Cupola Metal
All Shapes and Sizes

—o—

Miscellaneous Bessemer Iron Castings
Sprue Plates, Runners, Fountains

—o—

Valley Mould and Iron Corporation

Sharpsville, Pa.

The Utmost in Floor Value in IRVING PATENTED SUBWAY FLOORING

Sum up all the "Subway" advantages—a permanently smooth, comfortable, safe, non-slipping surface—80% open space for lighting and ventilation—maximum strength per unit of weight—material and construction time-proof and wear-proof—and a moderate first cost, with no after-cost.

There's "Subway" value.

Ample stocks of steel, complete organization, unequaled facilities, enable us to make prompt deliveries of any quantity.

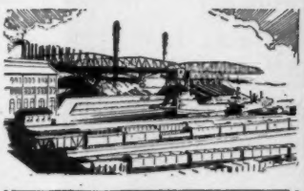
See Catalog 4A-32

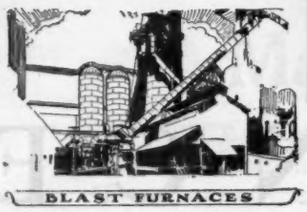
IRVING IRON WORKS CO. P-94

LONG ISLAND CITY, N.Y. U.S.A.

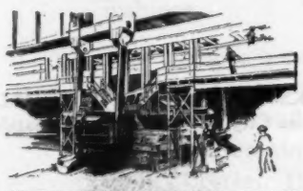
ORE MINING

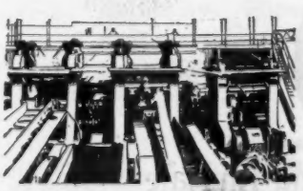
LOADING AT DOCKS

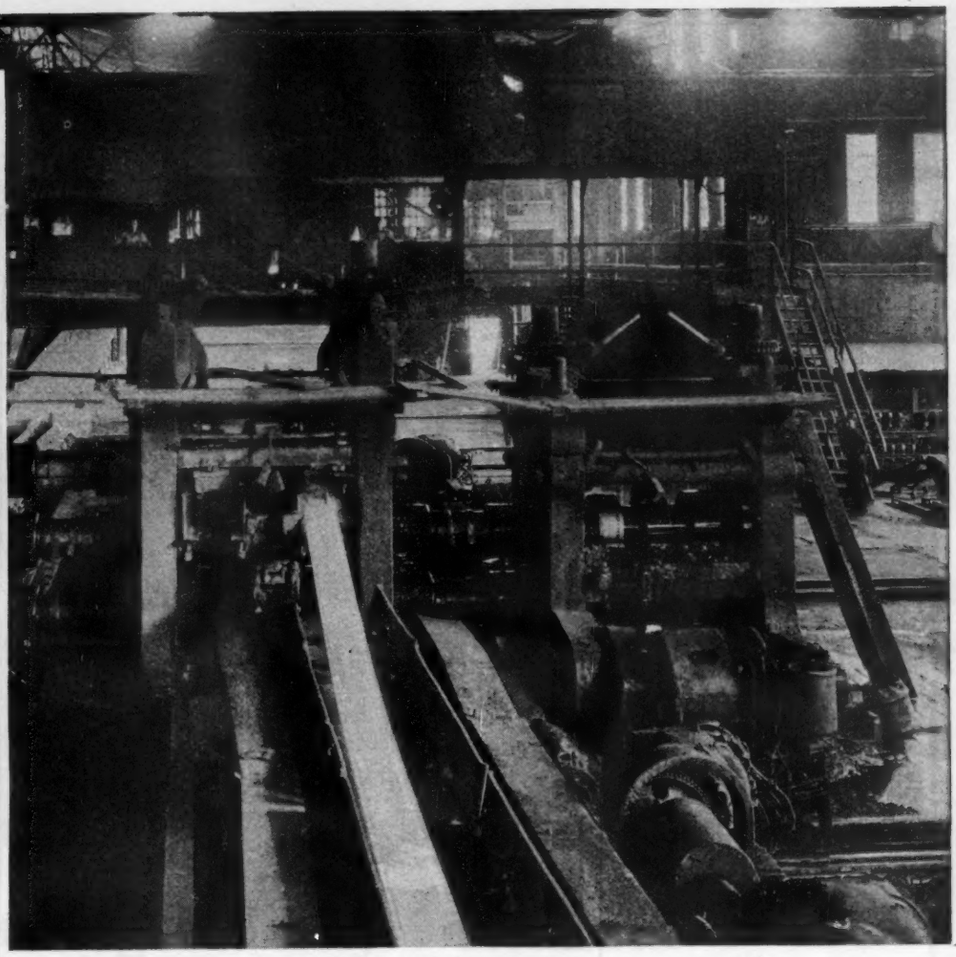

UNLOADING ORE


BLAST FURNACES

BESSEMER CONVERTERS


OPEN HEARTHS


ROLLING MILLS



Rolling Mill

After pouring from the furnaces, the steel is cast in ingots that are about 20 inches square at the bottom, 6 feet high, slightly tapered toward the top, and averaging 3½ tons in weight. Before going to the rolls, the ingots are heated in "soaking pits" to give them the same temperature and consistency all the way through.

As the white hot ingots go booming through the rolls, they quickly assume the shape of the finished product.

Whether your own particular need is for a massive 100 lb I-beam for a new sky-scraper, or a fractional pound angle iron for a new toy, you know that it is *right*, and up to specifications when it bears the ILLINOIS name.

For all along the line, every process has been under the supervision of experts,—experts who have at their command all the experience gained through, 60 years three generations, of steel making, reinforced by the newest discoveries and methods of modern science.

Illinois Steel Company

General Offices: 208 South LaSalle Street
CHICAGO, ILLINOIS

CONFIDENCE

DIAMOND NESCO SHEETS BRAND

Why have Nesco Sheets held the loyal confidence of the trade so long and so steadily? And why is this confidence constantly growing as proved by ever increasing sales? Nesco's reputation for ***uniform high quality*** based on complete facilities for testing and researching in our own plants is one reason. And Nesco's reputation for ***better delivery*** based on ample capacity plus an ideal location for serving the Far West, South West and Central West more efficiently is another equally important reason.

DIAMOND NESCO SHEETS BRAND

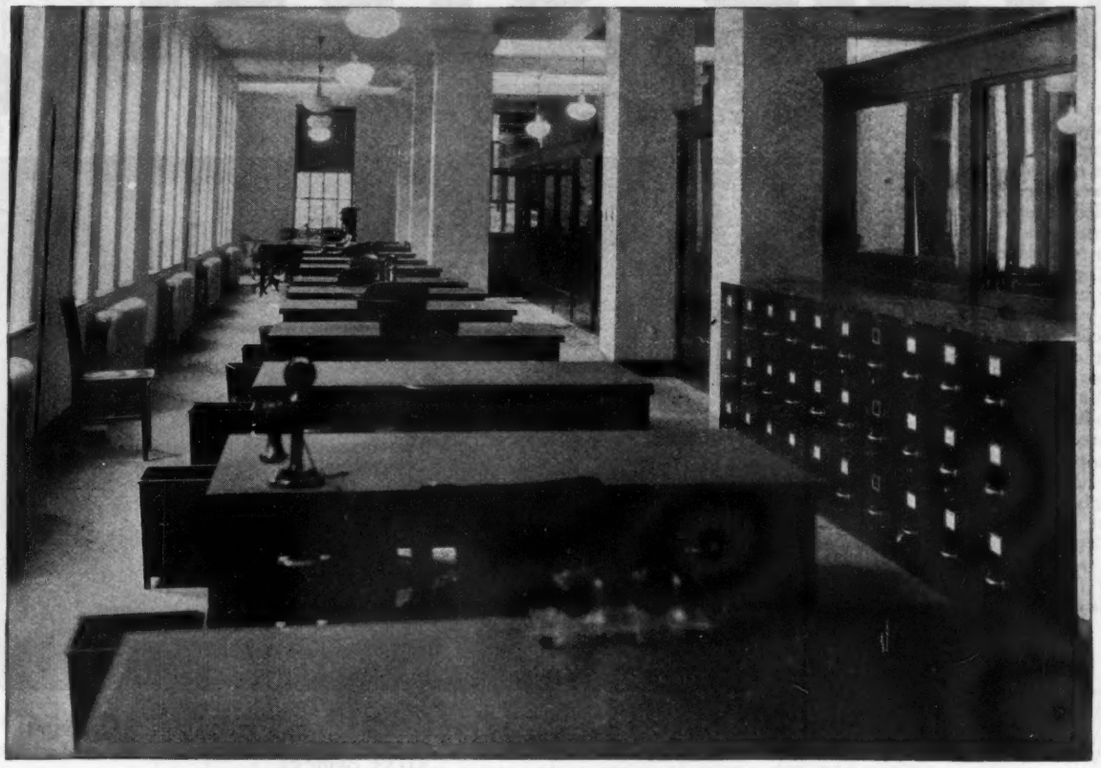
NATIONAL ENAMELING & STAMPING CO. INC. · GRANITE CITY STEEL WORKS · GRANITE CITY, ILL.
Chicago · Dallas · Davenport · Denver · Kansas City · Los Angeles · St. Paul · St. Louis · Salt Lake City · San Francisco · Seattle
Contributing Member

SHEET STEEL
TRADE EXTENSION COMMITTEE

NESCO

Galvanized, Blue Annealed and Black Sheets · Plates and Tin Plate

SHEETS



Making Beauty Practical

"OFFICE partitions of steel!—why, office partitions must be in keeping with the furnishings of the office, you know."

The man speaking was a leading fire prevention engineer—a man whose word carries tremendous weight in the construction and finish of all manner of buildings in one of America's largest cities.

But he didn't realize that Sheet Steel partitions *are* made to harmonize with furnishings.

This instance is typical of the lack of appreciation of the beauty of Sheet Steel and it is by no means confined to consumers—many manufacturers do not appreciate this possibility in steel. It is not realized that Sheet Steel offers more than strength and rugged durability. Witness the beautiful finishes that are now so common in automobile and the railway coach construction.

But Sheet Steel finishes are more than just beautiful. For the first time beauty has really become practical—the beauty of Sheet Steel endures. Surface finishes baked on Sheet Steel become practically an integral part of the material. They resist smoke, water, dirt and even to some extent acids. A cigarette can burn itself out on the polished surface without a trace.

Fabricators can do well to study the many advances that have been made in the art of finishing Sheet Steel, which make possible greater beauty and, what is more, *practical* beauty for all manner of products. In adopting these finishes they will find a keen interest on the part of the buying public. The Sheet Steel Trade Extension movement is establishing a new appreciation of this beauty of Sheet Steel. Progressive manufacturers and distributors will make the most of the possibilities offered.

SHEET STEEL
TRADE EXTENSION COMMITTEE
OLIVER BUILDING
PITTSBURGH PENNSYLVANIA

STRIP STEEL

Hot Rolled Cold Rolled

This new 20-16 in. Semi-Continuous Hot Strip Mill is producing lighter gauges in extreme widths than have ever before been rolled commercially on a strip mill. It enables us to produce material ¼-inch and lighter varying from 6 to 18½ inches wide either in coils or cut lengths. This installation, supplemented by our 9-inch and 12-inch units, together with a cold rolling department augmented by new cold mill equipment of latest design, now enables us to supply the highest grade of Hot and Cold Rolled Strip Steel in all gauges, and in widths ranging from 18½" to ¼". May we serve you?

WEST LEECHBURG STEEL COMPANY

General Offices: Farmers Bank Bldg., PITTSBURGH, PA. **Works: Leechburg, Pa.**

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Contributing Member

SHEET STEEL TRADE EXTENSION COMMITTEE

SHARON STEEL HOOP COMPANY

GENERAL OFFICE

SHARON PENNSYLVANIA

WORKS

SHARON, PA. YOUNGSTOWN, O. LOWELLVILLE, O.

AUTOMOBILE DISC STOCK AND FRAME STOCK HOT ROLLED

HOOPS BANDS STRIPS

BLACK PICKLED GALVANIZED

COPPER BEARING GRADE **COOPERAGE HOOP** STANDARD GRADE

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CANADIAN REPRESENTATIVES—
HUGH RUSSEL & SONS, LTD., MONTREAL, TORONTO

WE MAKE IT! DO YOU KNOW?

SHOVEL PLATE

The first complete book on welding—

"Fundamentals of Welding—
Gas, Arc and Thermit"

by James W. Owens

Today, for the first time, you can get a book that covers *all* phases of *all* kinds of welding. The gas, the arc, the thermit, and the resistance welding processes are all fully described and explained in this new volume—just off the press—the first book ever published that describes and explains *every* branch of the art.

It is a complete manual and encyclopedia that answers every question about the welding process. Not only does it describe and explain how each kind is done, but it shows which sort is best and cheapest for each purpose, how to calculate stresses and strengths, how to inspect and test a weld, explains the metallurgy of the various welding processes, describes all the kinds of machines and apparatus, and shows advantageous shop layouts and arrangements.

Never before has such a wealth of information on this important subject been gathered together between two covers. If you weld, or use welded parts, you ought to have this book on your desk for constant reference—it will answer your every question, tell you things you never knew before, and put back into your pocket dozens of times its cost.

672 pages ***279 illustrations***

Let us send you a copy on approval

The Penton Publishing Co.,
Lakeside Ave., & West 3rd St.,
Cleveland, Ohio

Date.....

You may send a copy of "Fundamentals of Welding—Gas, Arc and Thermit" to the address below for five days free examination. I will look it over and either return it in good order at the end of five days, in which case I am under no obligation, or will send you $10.00 in full payment.

Price $10.00 postpaid

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Address.....

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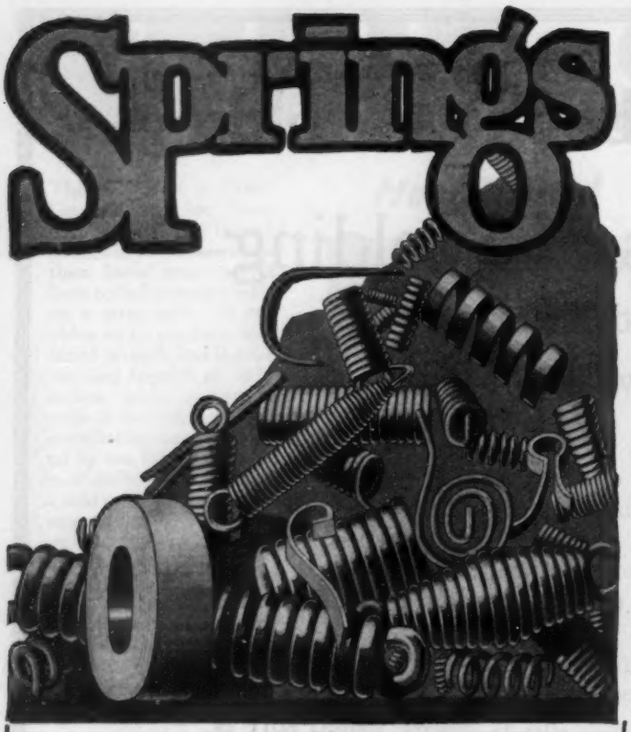
112 IFD



WICKWIRE SPENCER STEEL CO

Springs made to your design. Springs designed to fit your needs.

In either case—springs that meet specifications unerringly.

Wickwire Spencer Steel Company

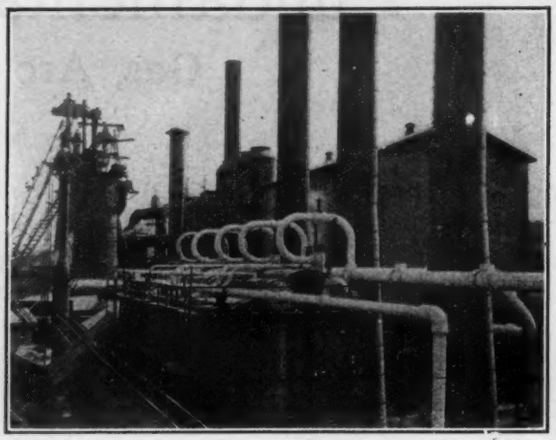
General Offices:

41 East Forty-second Street, New York

Worcester Buffalo Cleveland Chicago Detroit
San Francisco Los Angeles Seattle

WICKWIRE SPENCER *PRODUCTS*

POWER PLANT PIPING



YOUR piping is an important factor in safeguarding continuous and economical operation. It is as important as the power generator and should receive the consideration that its cost and importance warrant. Material, proper design, correct fabrication and erection safeguard continuous operation and make operation economical.

This company is prepared to contract for piping installations at any place in the United States and Canada and for any service including the highest pressure of superheated steam and hydraulic working pressure up to 5000 pounds.

Write for information

Pittsburgh Piping & Equipment Co.

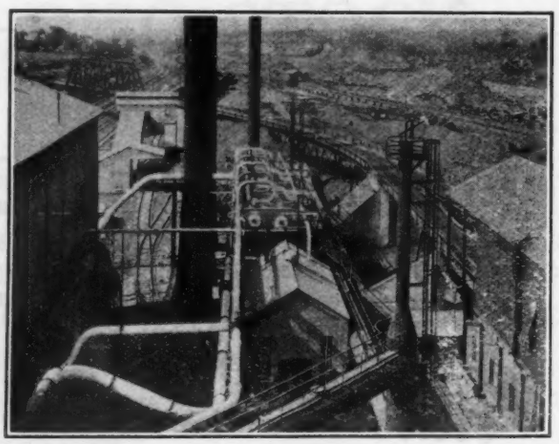
Manufacturers & Contractors

Specialists in Welded Wrought Steel Headers, Flanged Iron and Steel Fittings, Pipe Bends and Fabricated Piping for Power Plants.

General Office and Works, Pittsburgh, Pa.

District Offices

New York, 220 Broadway — Chicago, Peoples Gas Building
Cleveland, Ulmer Building — Indianapolis, Traction Ter. Bldg.
San Francisco, Call Building



When you think of Piping, think of PITTSBURGH PIPING

EMPIRE *New Process* BOLTS

THE only difference between an Empire *New Process* bolt and a hardened and ground gauge is that the bolt is made in a few seconds, and the gauge in a number of hours. There is no difference in fit.

This is how the thread of an EMPIRE new Process bolt looks on the comparator.

This is how the thread of a hardened and ground gauge looks on the comparator.

RUSSELL, BURDSALL & WARD BOLT & NUT COMPANY

PORT CHESTER, N.Y.

Branch Office: Straus Building	Branch Office: General Motors Bldg.	Branch Factory:	Scrimgle & Gillette 169 Jackson Street	Merdwell & Hartzell, Inc. 158-168 Eleventh Street
CHICAGO	**DETROIT**	**ROCK FALLS, Ills.**	**SEATTLE**	**SAN FRANCISCO**

Makers of Bolts, Nuts and Rivets Since 1845

Largest Builders of the World's Largest Cranes

204 of 100 Tons Capacity and Over

STANDARD CRANES

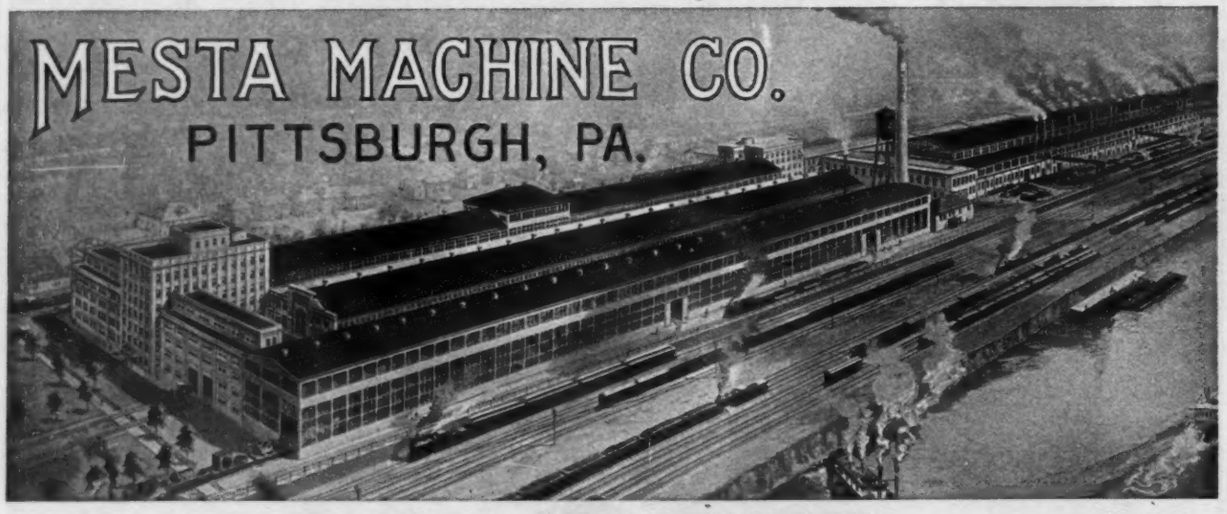
55	100 tons
2	115 tons
42	125 tons
24	150 tons
22	175 tons
2	200 tons
1	225 tons
1	250 tons
3	43 tons

TRIPPING CRANES

8	100 tons
1	125 tons
19	150 tons
13	200 tons
1	Single Ram, 320 tons

COMBINATION CHARGES and STRIPPERS

3	100 tons
3	150 tons
4	200 tons



GENERAL OFFICES AND WORKS: WEST HOMESTEAD, PA.

LIST OF PRINCIPAL PRODUCTS

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CORLISS
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GAS
BLOWING
STEAM DRIVEN
GAS DRIVEN
REVERSING
VACUUM PUMPS
AIR COMPRESSORS
ACCUMULATORS
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CONDENSERS

MILLS
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SLABBING
STRUCTURAL
RAIL
BAR
CONTINUOUS
TUBE
PLATE
UNIVERSAL
SHEET
TIN PLATE
WHEEL
TIRE
HOT and COLD STRIP

PRESSES
HYDRAULIC
STEAM HYDRAULIC
POWER
MANIPULATORS
PICKLING MACHINES
SHEARS
STEAM HYDRAULIC
HYDRAULIC
BLOOM
BAR
PLATE
SQUARING
DOUBLING

HOT SAWS
ROLL LATHES
GEARS
CUT and MACH. MOLDED
PINIONS
CUT and MACH. MOLDED
GEAR DRIVES
ROPE DRIVES
CASTINGS
STEEL
IRON
BRONZE

ROLLS
CHILLED IRON
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ALLOY STEEL

MESTA SPECIAL

FORGINGS
FORGING INGOTS
FORGING BILLETS

ON REQUEST WE WILL SEND SPECIAL BULLETIN ON ANY SUBJECT

They defy old age

These three "Bliss-Stiles" Presses were bought by their present owner over 24 years ago. Even then they weren't new, being obtained from another firm. Judged by the usual life of high speed equipment, they should have been worn out and relegated to the scrap heap long ago, but they are still actively on the job, turning out many thousands of sewing machine parts every day, and apparently good for many more years of useful service.

You can count on similar good service from the Bliss equipment *you* buy. Let us show you how we can help you economize on *your* sheet metal operations.

BLISS

SINCE 1857

"Bliss" on your machinery is more than a name; it's a guarantee.

BLISS

E. W. BLISS CO. MAIN OFFICE AND WORKS BROOKLYN, N. Y., U. S. A.

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American Factories: BROOKLYN, N. Y. HASTINGS, MICH. SALEM, OHIO CLEVELAND, OHIO

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Rolling 50,000 Tons of Billets *Without Redressing* Birdsboro "DURITE" Rolls

A large bolt and nut manufacturer has given us data on the performance of Birdsboro "DURITE" Rolls in a 16½" (continuous) roughing mill:

4" x 4" billets are rolled to an oval on one pass, and edged up into 2⅝" square on the second pass.

Five passes in each Roll (both first and second stands) rolled 50,000 tons of steel, without redressing.

Even after this large tonnage had been rolled, the second set of rolls (square pass, showed very little evidence of wear, and were continued in operation.

"DURITE" Rolls are the result of Birdsboro's years of careful study of roll service and its exacting requirements. Tests and service have proven "DURITE" Rolls' unusual resistance to fire-cracking under repeated heat stresses, and demonstrated that "DURITE" Rolls' wearing qualities are superior to those of rolls of other material.

Greater tonnage with less roll changing and lower turning costs follow "DURITE" installation. Try Birdsboro when you next need Rolls.

Birdsboro Rolls, that produce greater tonnages, and lower turning costs, are described in this bulletin. Write for a copy.

BIRDSBORO
STEEL FOUNDRY AND MACHINE COMPANY

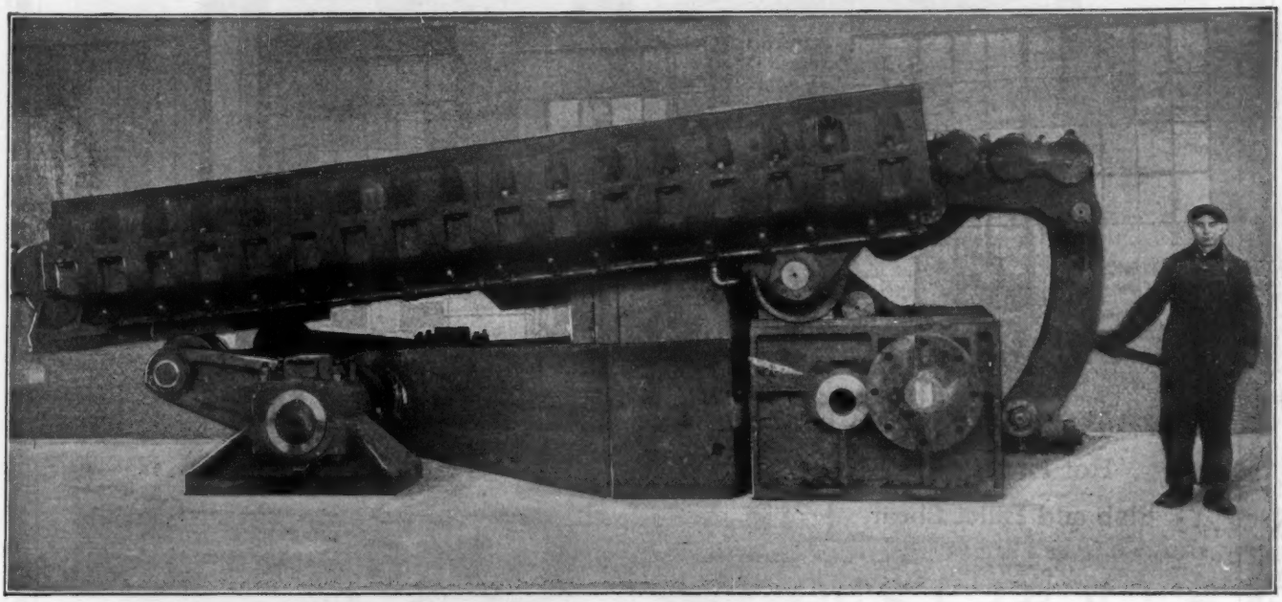
DESIGNERS AND BUILDERS

of hydraulic presses and equipment for boiler, structural and railroad shops, shipyards, rubber mills, linoleum plants, asbestos mills and other industries requiring hydraulic equipment. Hydraulic Operating Valves. Special Machinery. Rolling Mills. Rolling Mill Machinery. Steel and Iron Castings. Rolls: "Durite", Steel, Chilled and Sand. Railroad Castings. Bolsters. Side Frames. Forging Ingots. Crushing and Concentrating Machinery. Jackson Belt Lacers.

BIRDSBORO, PENNSYLVANIA

WHEELING

Shear Depressing Table



WHEELING QUALITY

STEEL ROLLS
SUPER-STEEL ROLLS
CHILLED ROLLS
SAND ROLLS

Mo-lyb-den-um ROLLS

STEEL AND IRON CASTINGS
ROLLING MILL MACHINERY
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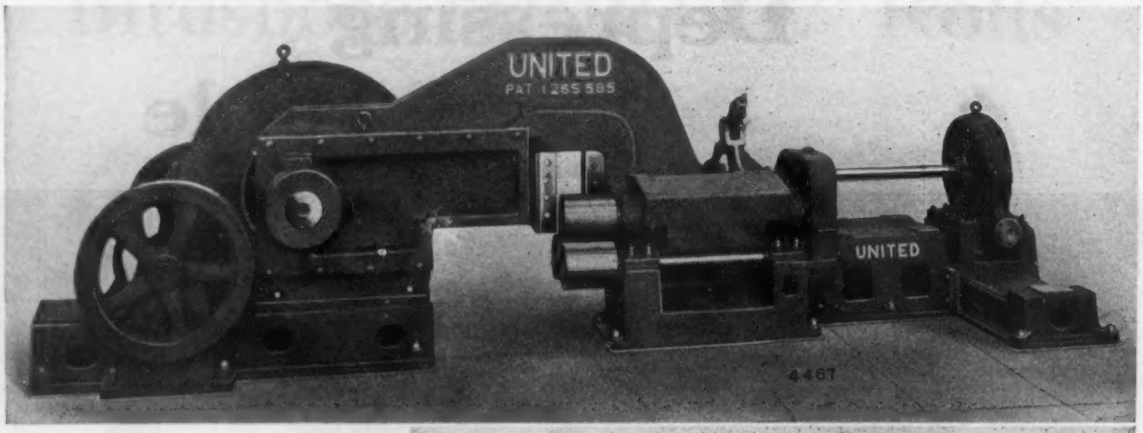
Shears
Roll Lathes

WHEELING MOLD & FOUNDRY CO.
WHEELING, W. VA.

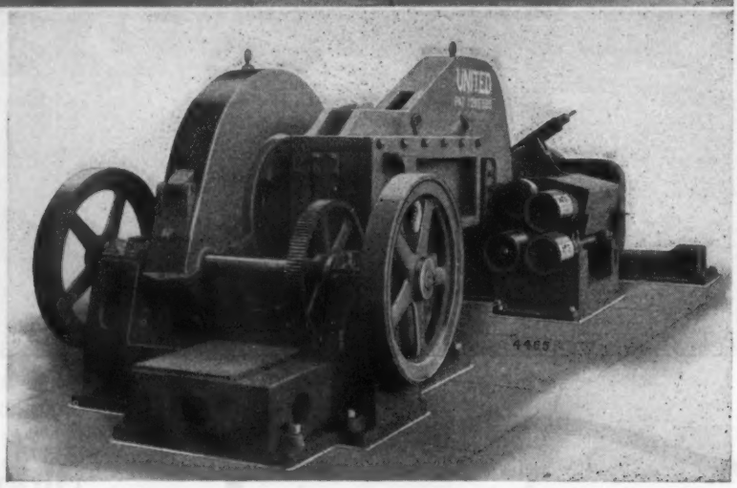
UNITED

COMPLETE SHEARING EQUIPMENT



20" x 3" or 7" x 7"
Hot Horizontal
Slab and Billet Shear

(PATENTED)



THIS shear is for use in front of a roughing mill for dividing slabs or billets between the furnace and the first stand of rolls, and makes it possible to reduce the number of sizes and lengths of stock slabs and billets to a minimum. As fewer billets have to be handled, the cost of this item is also less.

The shear is arranged to fit over the approach table and is provided with pinch rolls on the entering side. These rolls are motor-driven. A motor is also provided for raising and lowering these rolls. The entire design of the shear is of very rugged construction. It is equipped with our non-knocking type patented clutch.

Our wide experience puts us in position to furnish you the best possible equipment for your requirements. You can profit by our experience.

UNITED ENGINEERING & FOUNDRY CO.

PITTSBURGH, PA.

Builders of complete machinery equipment for Iron, Steel or Tube Works
"Largest Roll Makers in the World—Markers of the Largest Rolls"

ADAMITE

PATENTED

"THE RECORDS ARE PILING UP!"

Each Month adds additional Proof of the value of ADAMITE'S SERVICE.

"EVERY DAY—IN EVERY WAY"
IT PAYS TO BUY THE BEST——

The BEST MEN—
THE BEST MILLS—
THE BEST ROLLS—

Such a combination shows the **"EVERY DAY"** Value of ADAMITE.

Your cost sheets show it in **"EVERY WAY"**

ADAMITE ROLLS AND HEAVY DUTY CASTINGS

Sole Manufacturers { Mackintosh-Hemphill Co. / United Engineering & Foundry Co. } *Pittsburgh, Pa.*

Round, Square, Hexagon or Flat WIRE?

Whether your production calls for cold drawn or hot rolled, hard or soft wire.

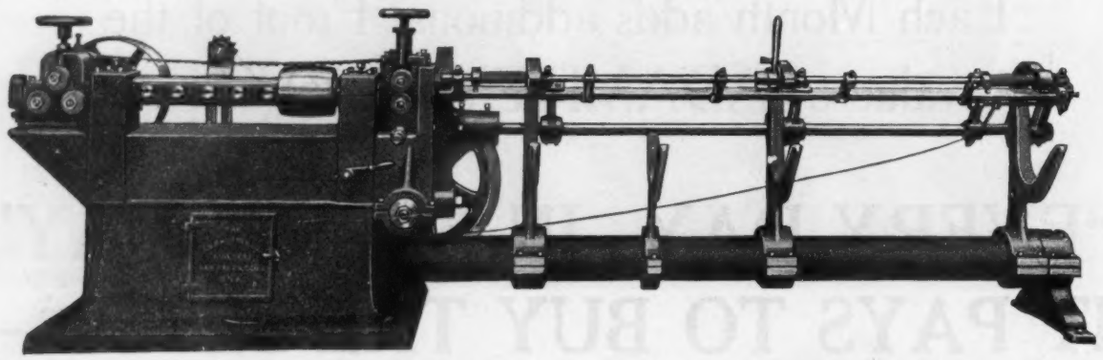
Shuster Straightening and Cutting Machines

will handle it

Furthermore, "Shuster" production is fast and accurate. The production figures will convince you that "Shuster" equipment is an investment that soon pays for itself.

Durability is another cardinal feature of Shuster Wire Cutters and Straighteners. Many of our machines built 25 to 30 years ago are still doing accurate work.

Write for production figures and latest catalog.



The F. B. SHUSTER COMPANY NEW HAVEN, CONN.

ESTABLISHED 1866

TWENTY-FIVE YEARS AGO

We installed a 35'' ***Blooming Mill*** in the ***Chicago District***
This Mill has Produced 4,806,291 Tons.
The Mill weighed 365,443 Pounds (approximately)
Its Amortization Cost was close to 3/10c per ton—
(***A NEGLIGIBLE FIGURE.***)

This is not an Exceptional Case.
It represents *What Our Mills are Doing.*

MACKINTOSH-HEMPHILL COMPANY

PIONEERS—ENGINEERS—BUILDERS

Established 1803 at Pittsburgh

"The Best in Rolling Mill Machinery"

FORT PITT WORKS
A. GARRISON FOUNDRY

PITTSBURGH IRON & STEEL FOUNDRY
WOODARD MACHINE CO.

SUTTON-ABRAMSEN
STRAIGHTENING MACHINES

FOR ALL PURPOSES
SUCH AS

SHEETS
(Copper, Brass and Steel)

HOT ROLLED BARS
(Soft Alloy and Tool Steel)

Straightening and Polishing Cold Drawn Shafting

For use in conjunction with Centerless Grinders

Extruded Brass and Copper Rods and Shapes

Brass and Copper Tubing

Buttweld, Lapweld and Seamless Tubing

Seamless and Lapwelded Boiler Tubing.

Electrically Welded and Brazed Tubing

Cold Drawn Tubing of all kinds

Heat Treated Bars

Hot Stretching

Pins or Other Short Round Pieces, heat treated, case-hardened or natural condition.

Write for bulletins and complete information if you are interested.

SUTTON-ABRAMSEN ENGINEERING CO.
PARK BUILDING PITTSBURGH, PA.

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Main Office: 100 E. 42d St., New York

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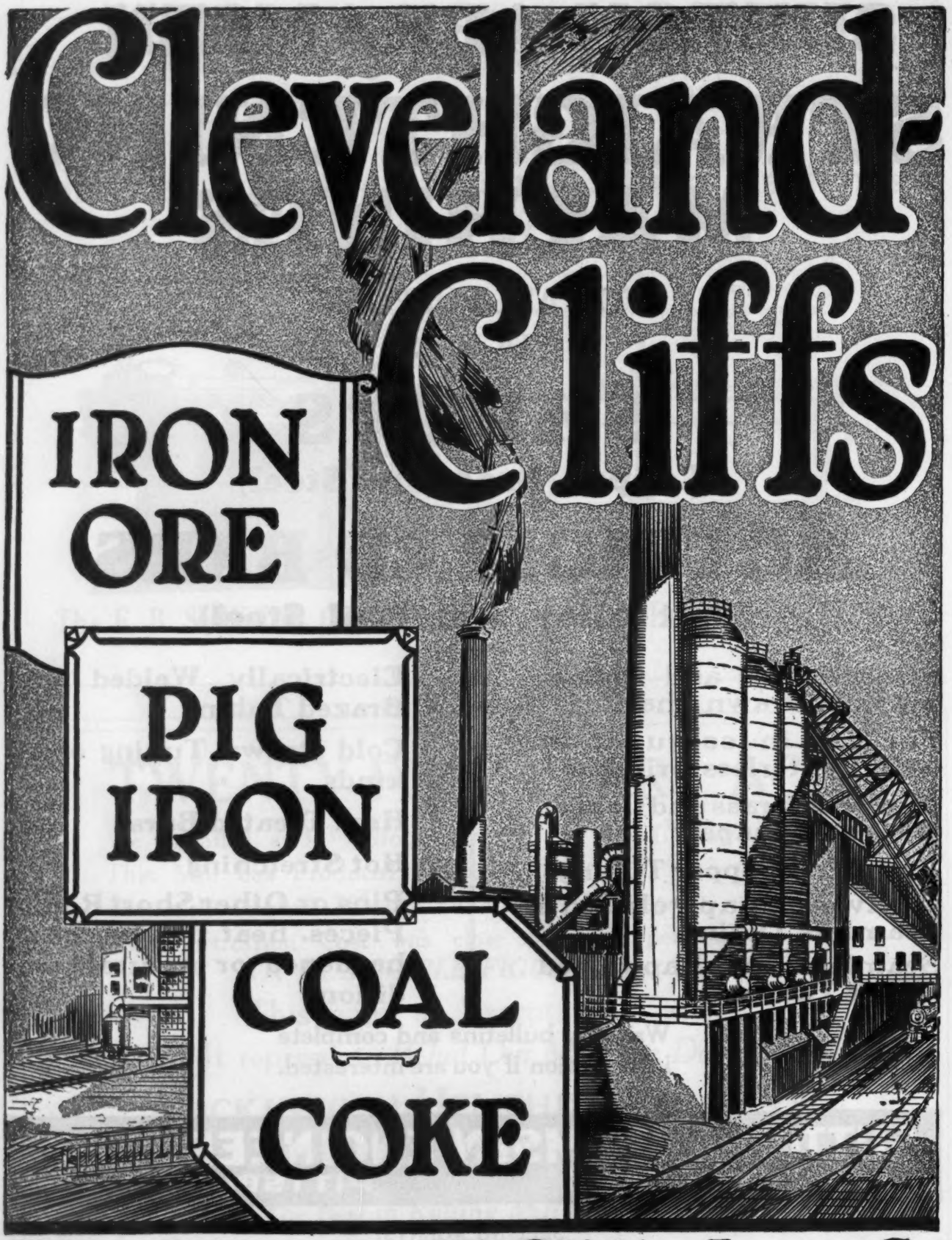


The Cleveland-Cliffs Iron Co
Union Trust Bldg., Cleveland, Ohio

You are using Electric Motors

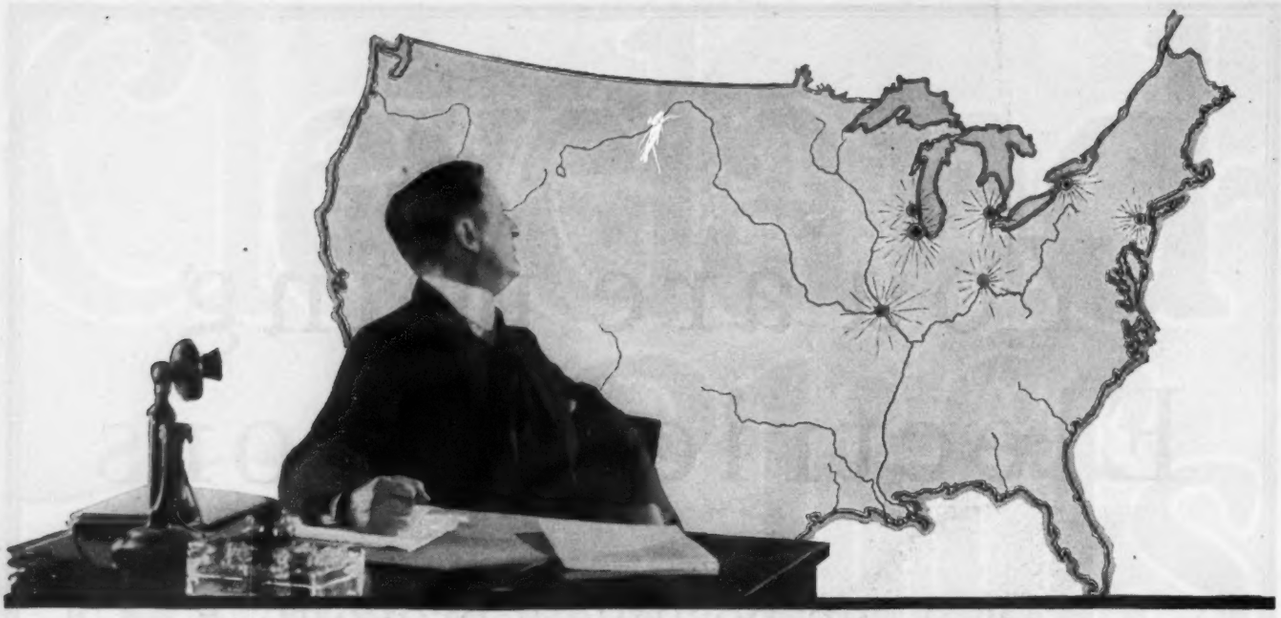
We can positively prove to you that by ordering your motors equipped with New Departure Ball Bearings you can cut your motor maintenance costs in half or more.

Write for folders giving the figures.

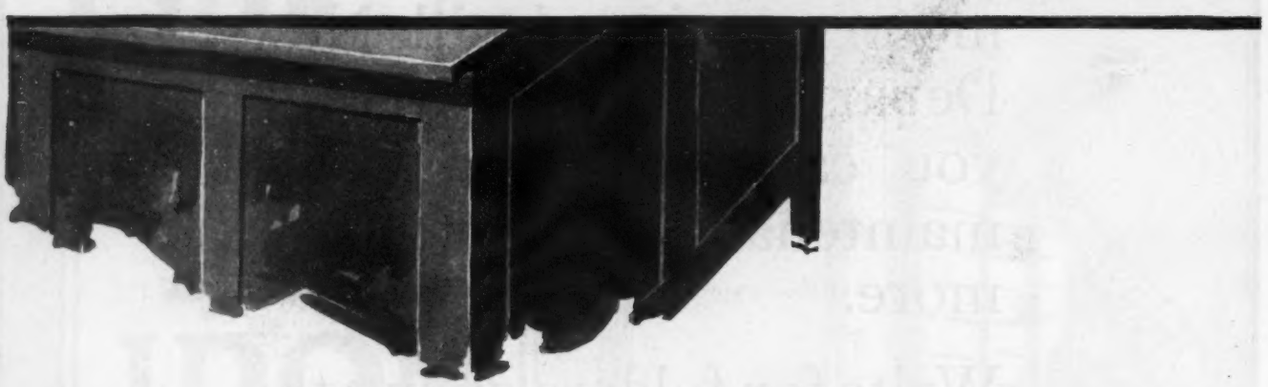
Motor Manufacturers will supply you New Departure equipped motors if you specify them.

The New Departure Manufacturing Co.

Detroit Bristol, Connecticut Chicago



Do You Have This Problem?



IF you buy steel for shipment to a job or plant at some other point, Ryerson can be of special service to you. Thru our chain of Steel-Service Plants you can order all your steel from one plant and shipment will be made from the Ryerson warehouse nearest the various destinations.

This means a saving in time and freight charges and makes it easy for you to place your orders. If you have this problem, talk it over with the Ryerson representative next time he calls—perhaps he can point out some other short cuts and savings, too.

Everything in Steel For Immediate Shipment.

Wire	Bars
Chain	Shapes
Forging Bars	Structurals
Billets	Rails
Boiler Tubes and Fittings	Shafting
	Strip Steel
Reinforcing Steel	Turnbuckles
Firmtread Plates	Babbitt
Alloy Steel	Plates
Tool Steel	Sheets
Small Tools	Rivets
Machinery, etc.	Bolts

Write for the Ryerson Journal and Stock List—the "key" to Immediate Steel.

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ESTABLISHED 1842

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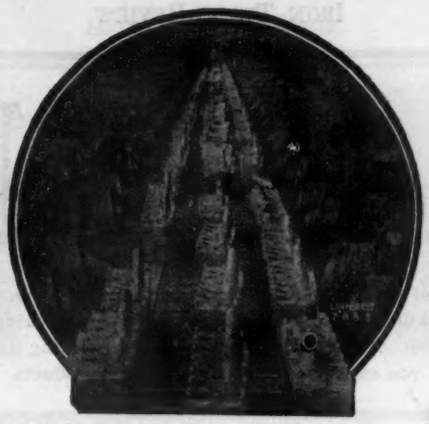
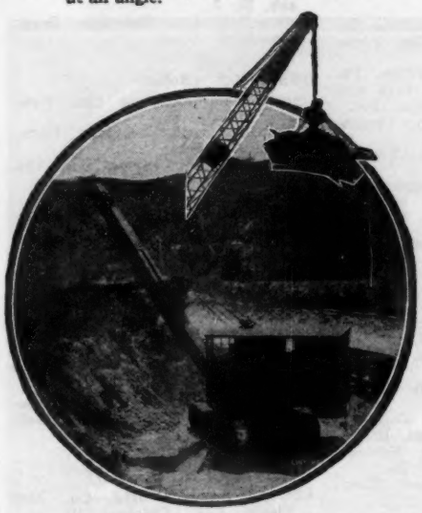
The Peck Pivoted Bucket Carrier is used for handling coal, ashes, cement, sand and other materials. Transports materials horizontally, vertically, or at an angle.



Progressive assembly Link-Belt Conveyors are used in various kinds of manufacturing plants. There may be a suggestion here for you. Consult with Link-Belt engineers.

Link-Belt furnishes complete belt conveyor installations for handling raw or finished, light or heavy materials—at any desired speed.



Unusually rugged, fast, and economical to operate, Link-Belt "Built for Service" Gasoline Crawler Cranes provide quick, cheap handling. Various attachments furnished. Write for Book 795.

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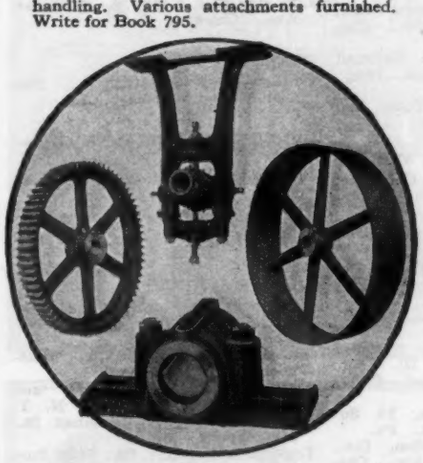
SAVING time, labor and power—producing with greater efficiency, at lower costs, and in larger volume than would otherwise be possible—these are some of the important results being accomplished with Link-Belt machinery.

For the transmission of power from prime mover to machines, Link-Belt Silent Chain, and other types of Link-Belt chain drives, are widely used. For handling raw and finished materials of every kind, Link-Belt conveyors, elevators, cranes, electric hoists, and practically every other type of mechanical handling equipment, are effectively employed.

To find out how you can produce more economically with Link-Belt elevating, conveying and power transmission equipment, address nearest Link-Belt office.

Link-Belt Silent Chain is the ideal drive, because it is a strong, long-lived, positive, yet flexible means of transmitting power. Drives from ½ to 10 H. P. in stock at a distributor near you.



Power transmission equipment, rugged and well constructed for continuous operation, bearings, gears, hangers, pulleys, sprockets, grease cups, safety collars, etc.

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Offices in Principal Cities

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ACCUMULATORS
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Pennsylvania Engineering Works, New Castle, Pa.
United Engineering & Foundry Co. Farmers Bank Bldg., Pittsburgh, Pa.
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.

ACETYLENE (Dissolved)
International Oxygen Co., Newark, N. J.
Prest-O-Lite Co., The, 30 E. 42nd St., New York City.

ACETYLENE GENERATORS
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

ACETYLENE IN CYLINDERS
International Oxygen Co., Newark, N. J.
Prest-O-Lite Co., The, 30 E. 42nd St., New York City.

ACIDS (Pickling)
American Chemical Paint Co., Ambler, Pa.

ADAMITE ROLLS
American Adamite Co., The, 12th & Etna Sts., Pittsburgh, Pa.

AIR COMPRESSORS—See COMPRESSORS (Air)

ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Metal & Thermit Corp., 120 Broadway, New York City.
Titanium Alloy Mfg. Co., Niagara Falls, New York.
Vanadium Corp. of America, 120 Broadway, New York City.

ALUMINUM
Leavitt, C. W., & Co., 30 Church St., New York City.
Rogers, Brown & Crocker Bros., Inc., 21 E. 40th St., New York City.

ALUMINUM (Vanadium)
Vanadium Corp. of America, 120 Broadway, New York City.

ALUMINUM TUBING
Summerill Tubing Co., Bridgeport, Pa.

ANGLES, TEES, CHANNELS—See STEEL (Structural)

ANNEALING BOXES
Adamson Machine Co., The, Akron, Ohio.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Pittsburgh Malleable Iron Co., 84th & Smallman Sts., Pittsburgh, Pa.
Riter-Conley Co., Oliver Bldg., Pittsburgh, Pa.
Smith, George H., Steel Casting Co., Milwaukee, Wis.
Union Steel Casting Co., 62nd and Butler Sts., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Zanesville Malleable Co., Zanesville, Ohio.

APPRAISALS
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.

AXLES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Champion Machine & Forging Co., The, 3675 E. 78th St., Cleveland, Ohio.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pollak Steel Co., Cincinnati, O.

BALING PRESSES
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.

BANDS AND HOOPS (Galvanized Strips)
Sharon Steel Hoop Co., Sharon, Pa.

BANDS (Iron)
Bethlehem Steel Co., Bethlehem, Pa.

BANDS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.

BANDS (Welded Iron and Steel)
Akron-Selle Co., Akron, O.

BAR BENDERS
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.

BARGES (Steel)
American Bridge Co., 71 Broadway, New York City.

BARRELS (Steel)
Cleveland Wire Spring Co., The, 1261 E. 38th St., Cleveland, O.

BARS (Acid Resistant)
Alcumite Corp., The, Dayton, Ohio.

BARS (Alloy)
Central Steel Co., Massillon, O.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge, Mass.

BARS (Concrete Reinforcements)
Bethlehem Steel Co., Bethlehem, Pa
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Franklin Steel Works, Franklin, Pa.
Gulf States Steel Co., Brown-Marx Bldg., Birmingham, Ala.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Pollak Steel Co., The, Cincinnati, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Truscon Steel Co., Youngstown, O.

BARS (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Milton Mfg. Co., The, Milton, Pa.
Morris, Wheeler & Co., 30th and Locust Sts., Philadelphia, Pa.
Penn Iron & Steel Co., Creighton, Pa.
Republic Iron & Steel Co., Youngstown, O.
Truscon Steel Co., Youngstown, O.

BARS (Steel)
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Steel Co., Massillon, O.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Pacific Coast Steel Co., Rialto Bldg., San Francisco, Calif.
Pollak Steel Co., The, Cincinnati, Ohio.
Ryerson, Jos. T., & Sons, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., 1351 Brown-Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

BARS, STEEL (Electric Furnace)
Timken Roller Bearing Co., The, Canton, Ohio.

BEAMS, CHANNELS, ANGLES, ETC.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Phoenix Iron Co., The, 20 So. 15th St., Philadelphia, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Snead Architectural Iron Works, Louisville, Ky.

BEARINGS (Ball)
Fafnir Bearing Co., The, New Britain, Conn.
New Departure Mfg. Co., The, Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.

BEARINGS (Journal)
Hyatt Roller Bearing Co., Newark, N. J.
Keystone Bronze Co., 39th St., Pittsburgh, Pa.

BEARINGS (Mill Alloyed)
Alchrome Casting & Bearing Corp., The, Chesire, Conn.

BEARINGS (Motor)
Fafnir Bearing Co., The, New Britain, Conn.
Hyatt Roller Bearing Co., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.

BEARINGS (Roller)
Hyatt Roller Bearing Co., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Thrust)
Fafnir Bearing Co., The, New Britain, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Timken Roller Bearing Co., The, Canton, O.

BELT DRESSING (Liquid & Paste)
B & H Engineering Laboratories, Inc., 4701 Grove St., Oakland, Cal.

BELT LACING (Leather)
Chicago Rawhide Mfg. Co., 1305 Elston Ave., Chicago, Ill.

BELTING (Chain)
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

BELTING (Leather)
Chicago Rawhide Mfg. Co., 1305 Elston Ave., Chicago, Ill.

BENCHES AND FRAMES (Drawing)
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., The, Cuyahoga Falls, O.

BENDING AND STRAIGHTENING MACHINES
Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., Cleveland, O.
Hinman, D. A., & Co., Sandwich, Ill.
Kane & Roach, Niagara and Shonnard Sts., Syracuse, N. Y.
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Long & Allstatter Co., Hamilton, O.
Sutton-Abramsen Engrg. Co., Park Bldg., Pittsburgh, Pa.
Wickes Brothers, 820 Water St., Saginaw, Mich.

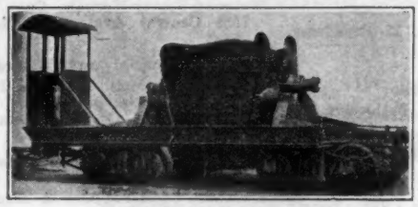
BENZOL AND TOLUOL RECOVERY PLANTS
Koppers Co., The, Union Trust Bldg., Pittsburgh, Pa.

BILLETS (Forging)
Bethlehem Steel Co., Bethlehem, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.

BILLETS (Forging, Alloy Steel)
Bethlehem Steel Co., Bethlehem, Pa.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

Equipment of the better class!



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Large Steel Ladles,—Hot Metal, Bin Filling and Ore Scale Cars.

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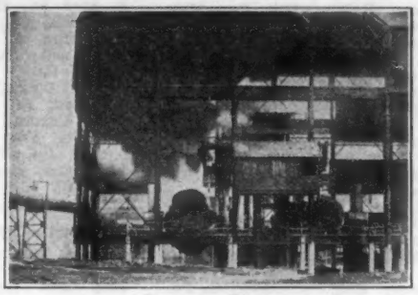
We shall be glad to send full details.



Bessemer Plant

Pennsylvania Engineering Works, New Castle, Pa.

New York Office 55 William St. *Builders of Blast Furnaces and Steel Mill Equipment* Pittsburgh, Pa. 530 Union Trust Bldg.

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STEEL —ALL CARBONS
CHROME SPECIALS—PHOENIX A-B

CHILL
—OF ANY DESIRED HARDNESS

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—UNEXCELLED FOR TONNAGE

PHOENIX METAL
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PITTSBURGH, PA.

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Don't experiment with a hammer you are not *sure* will prove an efficient, honest tool. It will be cheaper for you to ask us because—

For 52 years we have made

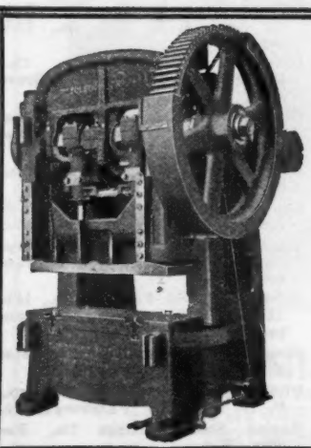
BRADLEY HAMMERS

as hammers should be made.

Let us tell you what we know of forging. It may help.

C. C. BRADLEY & SON
Syracuse N. Y.

*



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DOUBLE CRANK PRESSES OF KNOWN RELIABILITY

Over 250 sizes with adaptability covering practically every requirement of general sheet metal and drop forged work. They are conspicuous for sturdy, well balanced construction, long life and accurate, economical performance.

"PRESSES FOR EVERY PURPOSE"

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Engineers, Founders and Machinists on Equipment for Sheet Metal Products.

Chicago Office: 549 West Washington Blvd. Detroit Office: Room 3—250 General Motors Bldg.

BILLETS AND BLOOMS
American Rolling Mill Co., Middletown, O.
American Tube & Stamping Co., The, Bridgeport, Conn.
Andrews Steel Co., Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Central Steel Co., The, Massillon, Ohio.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Illinois Steel Co., 208 So. La Salle St., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Wood, Alan, Iron & Steel Co., Widener Bldg., Philadelphia, Pa.

BLANKS (Ring, Gear and Sprocket)
Akron-Selle Co., Akron, O.

BLAST FURNACES—See FURNACES (Blast)

BLOWERS
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York City.
Spencer Turbine Co., Hartford, Conn.

BLOWERS (Pressure)
Spencer Turbine Co., Hartford, Conn.

BLOWERS (Rotary Positive)
Connersville Blower Co., The, Connersville, Ind.
Roots, P. H. & F. M., Co., Connersville, Ind.

BLOW PIPES (Brazing, Welding, Cutting, Etc.)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

BLUE PRINTING MACHINERY
Pease, C. F., Co., The, 813 N. Franklin St., Chicago, Ill.
Wickes Brothers, 320 Water St., Saginaw, Mich.

BLUE PRINT PAPER
Pease, C. F., Co., The, 813 N. Franklin St., Chicago, Ill.

BOILER HEADS
Bethlehem Steel Co., Bethlehem, Pa.

BOILER WALL COATING
Celite Products Co., 11 Broadway, New York City.

BOILERS AND SUPERHEATERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Sotter Bros., Inc., Pottstown, Pa.

BOILERS (Waste Heat)
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Wickes Boiler Co., The, Saginaw, Mich.

BOILERS (Water Tube)
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Wickes Boiler Co., The, Saginaw, Mich.

BOILER TUBES—see TUBES (Boiler)

BOLT AND NUT MACHINERY
Landis Machine Co., Waynesboro, Pa.
National Machinery Co., Tiffin, O.

BOLT FORGING MACHINERY
Pawtucket Mfg. Co., Pawtucket, R. I.

BOLTS
Bethlehem Steel Co., Bethlehem, Pa.
Clark Bros. Bolt Co., Milldale, Conn.
Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.
Lake Erie Bolt & Nut Co., 915 E. 63rd St., Cleveland, O.
Milton Mfg. Co., The, Milton, Pa.
Oliver Iron & Steel Corp., So. 10th and Muriel Sts., Pittsburgh, Pa.
Rockford Bolt Co., 220 Mill St., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Sons, Inc., 16th and Rockwell Sts., Chicago, Ill.

BOLTS (Heat Treated)
Bethlehem Steel Co., Bethlehem, Pa.
Oliver Iron & Steel Corp., So. 10th and Muriel Sts., Pittsburgh, Pa.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge, Mass.

BOOKS (Technical)
Penton Publishing Co., Cleveland, O.

BOSH PLATES (Copper)
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.

BOXES (Carbonizing)
Driver-Harris Co., Harrison, N. J.
Farrell-Cheek Steel Foundry Co., Sandusky, O.

BOXES (Open Hearth Charging)
Wellman-Seaver-Morgan Co., The 7025 Central Ave., Cleveland, O.

BOXES (Steel)
Cleveland Wire Spring Co., The, 1261 E. 38th St., Cleveland, O.

BOXES (Tote)
Truscon Steel Co., Youngstown, O.

BRAKES (Electric)
Cutler-Hammer Mfg. Co., The, Milwaukee, Wis.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O.
General Electric Co., Schenectady, N. Y.

BRAKES (Metal Forming)
Streine Tool & Mfg. Co., The, New Bremen, Ohio.

BRASS
American Brass Co., 25 Broadway, New York City.
Williams & Co., Inc., 901 Pennsylvania Ave., Pittsburgh, Pa.

BRICK (Silica, Magnesia, Chrome, Super-refractories)
General Refractories Co., 117 S. 16th St., Philadelphia, Pa.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Soisson, Jos., Fire Brick Co., Connellsville, Pa.
Stowe-Fuller Refractories Co., 1650 Union Trust Bldg., Cleveland, O.

BRICK INSULATING — See INSULATING BRICK

BRIDGE CRANES (Ore and Coal Handling)
McMyler-Interstate Co., The, Bedford, O.
Wellman-Seaver-Morgan Co., The, 7025 Central Ave., Cleveland, O.

BRIDGES, BUILDINGS, VIADUCTS, STACKS (Steel)
American Bridge Co., 71 Broadway, New York City.
Belmont Iron Works, 22nd and Washington Ave., Philadelphia.
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Eichleay, John, Jr., Co., So. 20th and Wharton, Pittsburgh, Pa.
McClintic-Marshall Co., Oliver Bldg., Pittsburgh, Pa.
Morgan Engrg. Co., The, Alliance, Ohio.
Mt. Vernon Bridge Co., Mt. Vernon, O.
Phoenix Bridge Co., 20 S. 15th St., Philadelphia, Pa.
Steel Plate Products Co., Pottstown, Pa.
Truscon Steel Co., Youngstown, O.

BRONZE
American Brass Co., 25 Broadway, New York City.

BRONZE (Manganese)
Bethlehem Steel Co., Bethlehem, Pa.

BUCKETS (Clam Shell)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Brosius, Edgar E., 223 Fourth Ave., Pittsburgh, Pa.
Browning Crane Co., 162nd and Waterloo Rd., Cleveland, Ohio.
Industrial Works, Bay City, Mich.
Wellman-Seaver-Morgan Co., The, 7025 Central Ave., Cleveland, O.
Williams, G. H., Co., 611 Hayburger Lane, Erie, Pa.

BUCKETS (Clam Shell, Orange Peel, Drag Line, Grab)
McMyler-Interstate Co., Bedford, O.

BUCKETS (Dumping)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.

BUCKETS (Elevator)
Hendrick Mfg. Co., Carbondale, Pa.

BUCKETS (Grab)
Blaw-Knox Company, 602 Farmers Bank Bldg., Pittsburgh, Pa.
Brosius, Edgar E., 223 Fourth Ave., Pittsburgh, Pa.
Brown Hoisting Machinery Co., 4403 St. Clair Ave., Cleveland, O.
Browning Crane Co., 162 and Waterloo Rd., Cleveland, Ohio.
Harnischfeger Corp., 38th & National, Milwaukee, Wis.
Industrial Works, Bay City, Mich.
Link-Belt Co., 910 So. Michigan Ave., Chicago, Ill.
Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.
Williams, G. H., Co., 611 Hayburger Lane, Erie, Pa.

BUILDINGS (Steel)—See BRIDGES, BUILDINGS AND VIADUCTS

BULLDOZERS
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Long & Allstatter Co., Hamilton, Ohio.

BURNERS (Acetylene) — See TORCHES AND BURNERS (Acetylene, Blow, Oxyacetylene)

BURNERS (Fuel, Oil, Gas and Combination)
General Furnace Co., 1015 Chestnut St., Philadelphia, Pa.
Hagan, George J., Co., Chamber of Commerce Bldg., Pittsburgh, Pa.
Strong, Carlisle & Hammond Co., The, 326 Frankfort Ave., Cleveland, Ohio.

BURNERS OIL
Best, W. N., Corp., 11 Broadway, New York City.

BY-PRODUCT PLANTS
Koppers Co., The, Union Trust Bldg., Pittsburgh, Pa.

CAN MAKING MACHINERY
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.

CARBON BURNING APPARATUS
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

CARBURIZING COMPOUND CLEANER AND GRADER
Brown Lynch Scott Co., Monmouth, Ill.

CAR DUMPERS (Coal, Ore and Ash Handling Machinery)
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
McMyler-Interstate Co., The, Bedford, Ohio.
Wellman-Seaver-Morgan Co., The, 7025 Central Ave., Cleveland, O.

CARS (Industrial and Mining)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.

CARS (Ingot and Open Hearth Charging)
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Pennsylvania Engineering Works, New Castle, Pa.

CASTINGS (Acid Resistant)
Alcumite Corp., The, Dayton, O.

CASTINGS (Alloy)
Alcumite Corp., The, Dayton, O.

CASTINGS (Alloy Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Chicago Steel Foundry Co., Kedzie Ave. & E. 87th St., Chicago, Ill.
Cincinnati Steel Castings Co., Queen City and Spring Grove Ave., Cincinnati, Ohio.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Nugent Steel Casting Co., 31st and Wood Sts., Chicago, Ill.
Sivyer Steel Castings Co., Milwaukee, Wis.
Stroh Steel Hardening Process Co., Westinghouse Bldg., Pittsburgh, Pa.
Union Steel Castings Co., 62nd and Butler Sts., Pittsburgh, Pa.

CASTINGS (Bessemer Iron)
Valley Mould & Iron Corp., Sharpsville, Pa.

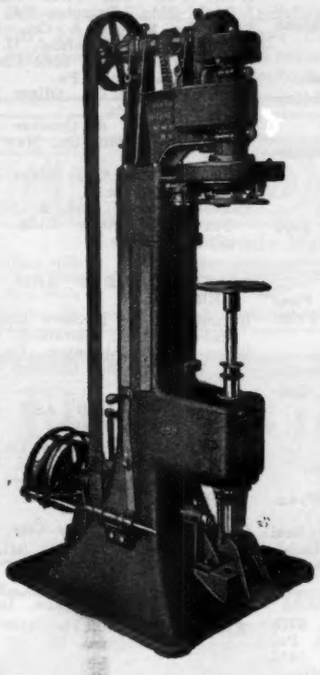
CASTINGS (Brass, Bronze, Copper, Aluminum)
Alchrome Bearing & Casting Corp., The, Chesire, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Enterprise Brass Works, Muskegon, Mich.
Keystone Bronze, Co., 39th St., Pittsburgh, Pa.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
Mesta Machine Co., Homestead, Pa.
Metal & Alloy Specialties Co., Inc., 1879 Elmwood Ave., Buffalo, N. Y.
White, S. S., Dental Mfg. Co., The, 211 S. 12th St., Philadelphia, Pa.

CASTINGS (Chemical)
Alcumite Corp., The, Dayton, O.

CASTINGS (Electric Steel)
Acme Steel & Malleable Iron Works, 245 Military Rd., Buffalo, N. Y.
Chicago Steel Foundry Co., Kedzie Ave. & E. 87th St., Chicago, Ill.
Cincinnati Steel Castings Co., Queen City and Spring Grove Ave., Cincinnati, Ohio.
Crucible Steel Castings Co., The, Almira and W. 34th St., Cleveland, O.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Los Angeles Foundry Co., 2444 S. Alameda St., Los Angeles, Calif.
Maynard Electric Steel Castings Co., 2-12 Kilbourn Rd., Milwaukee, Wis.
Milwaukee Steel Foundry Co., 101-121 So. Walter St., Milwaukee, Wis.
Nugent Steel Castings Co., 31st & Wood Sts., Chicago, Ill.
Pittsburgh Electric Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Racine Steel Castings Co., Racine, Wis.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

AMS
Automatic Double Seamers



Are unequalled for crimping the ends to pails, tubs, drums and other containers of tin and heavy sheet metal.

No hand levers are used to operate Seaming Rollers.

Write for catalog and complete details.

The Max Ams Machine Co.
101 Park Ave., New York, N.Y.
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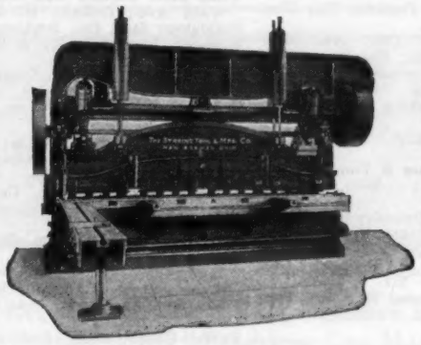

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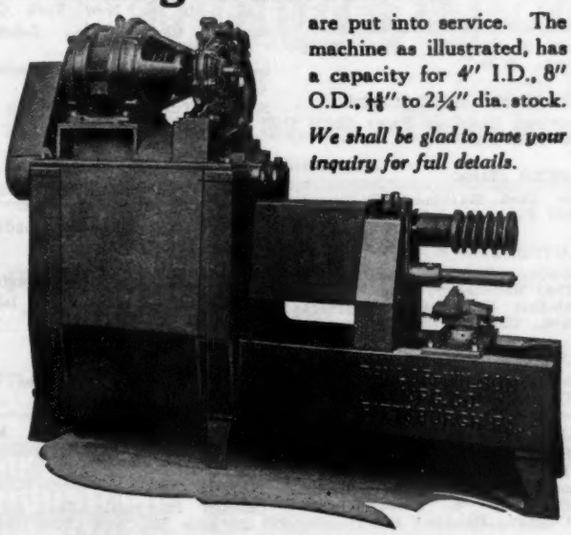

are put into service. The machine as illustrated, has a capacity for 4" I.D., 8" O.D., ⅛" to 2¼" dia. stock.

We shall be glad to have your inquiry for full details.

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ENGINEERS—FOUNDERS—MACHINISTS
MAIN OFFICE AND WORKS McKEES ROCKS, PA.
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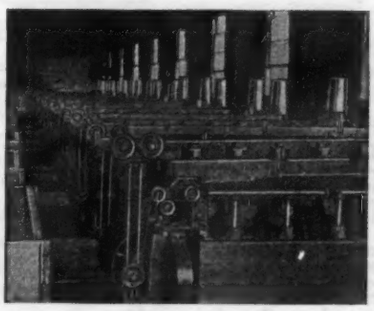

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Armoring Machinery for "BX", etc.
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Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Cascade Foundry Co., 19th & Plum Sts., Erie, Pa.
Cyclops Foundry Co., 1503 Union Bank Bldg., Pittsburgh, Pa.
Lake Shore Engine Works, Marquette, Mich.
Link-Belt Co., 910 So. Michigan Ave., Chicago, Ill.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Mesta Machine Co., Homestead, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Moloch Co., The, Kaukauna, Wis.
National Roll & Foundry Co., The, Avonmore, Pa.
Pacific Foundry Co., 19th and Treat Aves., San Francisco, Cal.
Pennsylvania Engineering Works, New Castle, Pa.
Standard Engineering Co., Ellwood, City, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Walworth Run Foundry Co., The, W. 27th & Nickel Plate R. R., Cleveland, Ohio.
Wheeling Mold & Foundry Co., Wheeling, W. Va.
White, S. S., Dental Mfg. Co., The, 211 S. 12th St., Philadelphia, Pa.

CASTINGS (Heat Resistant)
Driver-Harris Co., Harrison, N. J.
Farrell-Cheek Steel Foundry Co. Sandusky, O.

CASTINGS (Malleable)
Acme Steel & Malleable Iron Works, Inc., 245 Military Rd., Buffalo, N. Y.
American Malleable Castings Association, Union Trust Bldg., Cleveland, O.
Belle City Malleable Iron Co., Racine, Wis.
Berryhill Malleable Iron Co., Evansville, Ind.
Columbus Malleable Iron Co., Columbus, O.
Danville Malleable Iron Co., Danville, Iowa.
Dayton Malleable Iron Co., Dayton, O.
Decatur Malleable Iron Co., Decatur, Ill.
Frazer & Jones Co., 351 W. Fayette St., Syracuse, N. Y.
Illinois Malleable Iron Co., 1801 Diversey Blvd., Chicago, Ill.
Iowa Malleable Iron Co., Fairfield, Iowa.
Kalamazoo Malleable Iron Co., Kalamazoo, Mich.
Lakeside Malleable Castings Co., Racine, Wis.
Link-Belt Co., P. O. Box 846, Indianapolis, Ind.
Marion Malleable Iron Works, Marion, Ind.
Moline Malleable Iron Co., St. Charles, Ill.
Newark Malleable Iron Works, Newark, N. J.
Northern Malleable Iron Co., St. Paul, Minn.
Northwestern Malleable Iron Co., Milwaukee, Wis.
Peoria Malleable Castings Co., Peoria, Ill.
Pittsburgh Malleable Iron Co., 34th & Smallman Sts., Pittsburgh, Pa.
Rockford Malleable Iron Works, Rockford, Ill.
Ross-Meehan Foundries, Chattanooga, Tenn.
Temple Malleable Iron & Steel Co., Harrison Bldg., Philadelphia, Pa.
Vermillion Malleable Iron Co., Hoopeston, Ill.
Wisconsin Malleable Iron Co., Milwaukee, Wis.
Zanesville Malleable Co., Zanesville, O.

CASTINGS (Monel Metal)
Pittsburgh Valve, Foundry & Construction Co., 26th & A. V. Ry., Pittsburgh, Pa.

CASTINGS (Nickel Chromium)
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Driver-Harris Co., Harrison, N. J.

CASTINGS (Semisteel)
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

CASTINGS (Steel)
Adamson Machine Co., The, Akron, Ohio.
Allegheny Steel Co., Brackenridge, Pa.
American Adamite Co., The, 12th & Etna Sts., Pittsburgh, Pa.
American Steel Foundries, 410 No. Michigan Ave., Chicago, Ill.
Atlas Steel Casting Co., 1963 Elmwood Ave., Buffalo, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Cann & Saul Steel Co., 516 Commerce St., Philadelphia, Pa.
Carbon Steel Casting Co., Lancaster, Pa.
Chicago Steel Foundry Co., Kedzie Ave. at 37th St., Chicago, Ill.
Columbia Steel Corp., Balfour Bldg., San Francisco, Cal.
Commercial Steel Castings Co., The, Marion, O.
Crucible Steel Castings Co., The, Almira and W. 84th St., Cleveland, O.
Deemer Steel Casting Co., 9th and Washington Ave., New Castle, Del.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Federal Steel Foundry Co., Chester, Pa.
Hadfield-Penfield Steel Co., Bucyrus, Ohio.
Hubbard Steel Fdry. Co., E. Chicago, Ind.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Maynard Electric Steel Castings Co., 2-12 Kilbourn Rd., Milwaukee, Wis.
Mesta Machine Co., Homestead, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Milwaukee Steel Foundry Co., 101-121 South Water St., Milwaukee, Wis.
National Roll & Foundry Co., The, Avonmore, Pa.
Nugent Steel Castings Co., 31st & Wood Sts., Chicago, Ill.
Racine Steel Castings Co., Racine, Wis.
Reading Steel Casting Co., Reading, Pa.
Reliance Steel Casting Co., 28th and Smallman Sts., Pittsburgh, Pa.
Ross-Meehan Foundries, Chatanooga, Tenn.
Sharon Foundry Co., Sharon, Pa.
Sivyer Steel Casting Co., Milwaukee, Wis.
Smith, George H., Steel Casting Co., Milwaukee, Wis.
Stroh Steel Hardening Process Co., Westinghouse Bldg., Pittsburgh, Pa.
Strong Steel Foundry Co., 33 Norris St., Buffalo, N. Y.
Union Steel Casting Co., 62nd and Butler Sts., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
West Steel Castings Co., 805 E. 70th St., Cleveland, O.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

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Quigley Furnace Specialties Co., 26 Cortlandt St., New York City.

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CENTRAL STATION EQUIPMENT
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Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

CHAIN DRIVES
Link-Belt Co., 910 So. Michigan Ave., Chicago, Ill.

CHAINS (Power Transmission)
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

CHANNELS—See STEEL Structural)

CHAPLETS
Erdle Perforating Co., 171 York St., Rochester, N. Y.

CHARCOAL
Hillman Coal & Coke Co., First National Bank Bldg., Pittsburgh, Pa.

CHARGING MACHINES (Cupola)
Roots, P. H. & F. M., Co., Connersville, Ind.

CHEMICALS
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Ford, J. B., Co., The, Wyandotte, Mich.
Hearne, William W., Inc., Real Estate Trust Bldg., Philadelphia, Pa.

CHISEL BLANKS
Hunter Saw & Machine Co., 57th and Butler Sts., Pittsburgh, Pa.
Marchant, George F., Co., 1434 S. Rockwell St., Chicago, Ill.

CHROME VANADIUM
Allen, Edgar, Steel Co. Inc., 718-722 W. Lake St., Chicago, Ill.

CHROMIUM METAL
Electro Metallurgical Sales Corp. 30 E. 42nd St., New York City

CHUCKS (Lathe)
Whiton, D. E., Machine Co., New London, Conn.

CLAMPS (Plate Handling)
Never Slip Safety Clamp Co., 51 E. 42nd St., New York City.

CLEANER (Metal)
American Chemical Paint Co., Ambler, Pa.
Ford, J. B., Co., The, Wyandotte, Mich.

CLEANING SPECIALTIES
Ford, J. B., Co., The, Wyandotte, Mich.

CLEANSING SPECIALTIES
American Chemical Paint Co., Ambler, Pa.

CLOCKS (Time)
New York Machinery Co., 200 Fifth Ave., New York City.

CLUTCHES
Johnson, Carlyle, Machine Co. The, Manchester, Conn.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

CLUTCHES (Cut-Off Coupling)
Johnson, Carlyle, Machine Co. The, Manchester, Conn.

CLUTCHES (Friction)
Johnson, Carlyle, Machine Co. The, Manchester, Conn.
Jones, W. A., Foundry & Machine Co., 4437 W. Roosevelt Ave. Chicago, Ill.

COAL AND COKE
Agnew, Batteiger & Co., 1630-32 Widener Bldg., Philadelphia, Pa.
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Eaton, Rhodes & Co., First National Bank Bldg., Cincinnati, O.
Hanna, The M. A., Co., Leader-News Bldg., Cleveland, O.
Hillman Coal & Coke Co., First National Bank Bldg., Pittsburgh, Pa.
Irwin Fuel Co., First National Bank Bldg., Latrobe, Pa.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Pilling & Co., Inc., 1500 Chestnut St., Philadelphia, Pa.
Pittsburgh Coal Co., Oliver Bldg., Pittsburgh, Pa.
Rogers, Brown & Crocker Bros., Inc., 21 E. 40th St., New York City.
Snyder, W. P., Co., Oliver Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

COAL CRUSHERS AND PULVERIZERS
Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland, O.
Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.

COAL, ORE AND ASH HANDLING MACHINERY
Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland, O.
Brown Hoisting Machinery Co., 4403 St. Clair Ave., Cleveland, O.
Industrial Works, Bay City, Mich.
Link-Belt Co., 910 So. Michigan Ave., Chicago, Ill.
Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.
Webster Mfg. Co., The, 4500 Cortland St., Chicago, Ill.

COKE—See COAL AND COKE

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., 1146 Ivanhoe Rd., Cleveland, O.
Pennsylvania Engineering Works, New Castle, Pa.
Wellman-Seaver-Morgan Co., The, 7025 Central Ave., Cleveland, O.

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General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York City.
Spencer Turbine Co., Hartford, Conn.

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Ingersoll-Rand Co., 11 Broadway, New York City.

CONCRETE ARMORING (Surface)
Irving Iron Works, Long Island City, N. Y.

CONCRETE INSERTS
Dayton Malleable Iron Co., Dayton, O.

CONCRETE MIXERS—See MIXERS (Concrete)

CONDENSERS
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CONDUITS (Electric)
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Special Travelling Head
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With complete equipment for machining locomotive cylinders, including special chucks for holding and centering cylinders from the bore.
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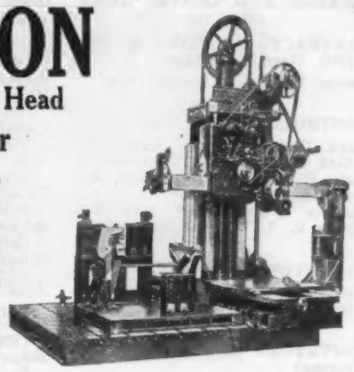

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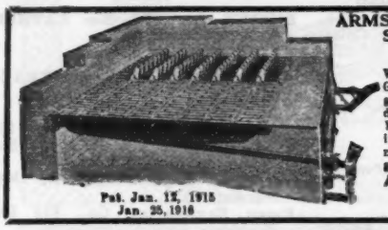

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Jan. 25, 1916

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PIPE THREADING and CUTTING MACHINE
PRODUCT of 50 YEARS EXPERIENCE
Range up to 16"—HAND—BELT—ELECTRIC
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"National" Wedge Grip Bolt and Rivet Headers, National Bolt Cutter, National Heavy-Pattern Forging Machines, etc.
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"We Guarantee Results"
F. & D. Producer Gas Systems
Using Bituminous and Anthracite Coals
Raw and Scrubbed Gas for displacing Oil, City and Natural Gas, Coal and Coke in Furnaces of all descriptions.
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Clark Controller Co., The, 1146 E. 152nd St., Cleveland, O.
Cutler-Hammer Mfg. Co., The, Milwaukee, Wis.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O.

CONVEYORS (Belt)
Webster Mfg. Co., The 4500 Cortland St., Chicago, Ill.

CONVEYORS (Elevating and Conveying)
Bartlett, C. O., & Snow Co., 6208 Harvard Ave., Cleveland, O.
Brown Hoisting Machinery Co., 4403 St. Clair Ave., Cleveland, O.
Link-Belt Co., 910 So. Michigan Ave., Chicago, Ill.

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Mackintosh Engineering Co., Schofield Bldg., Cleveland, Ohio.

COOLERS (Copper)
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.

COOLING BEDS
Morgan Construction Co., Worcester, Mass.

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American Brass Co., 25 Broadway, New York City.

COPPER AND BRASS DRAWING MACHINERY
Vaughn Machinery Co., The Cuyahoga Falls, O.

CORE MAKING MACHINES
American Foundry Equipment Co., Mishawaka, Ind.

CORRUGATING AND CRIMPING MACHINES (Cold Rolled)
Streine Tool & Mfg. Co., The, New Bremen, Ohio.

COTTER PINS
Hindley Mfg. Co., John St., Valley Falls, R. I.

COUNTING MACHINES
Veeder Mfg. Co., Hartford, Conn.

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Bradley, C. C., & Son, Inc., 432 N. Franklin St., Syracuse, N. Y.

COUPLINGS (Flexible)
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O.
James, D. O., Mfg. Co., 1120 W. Monroe St., Chicago, Ill.

CRANES
Bedford Foundry & Machine Co., Bedford, Ind.

CRANES (All Types)
Cyclops Iron Works, 827 Folsom St., San Francisco, Cal.

CRANES (Charging)
Alliance Machine Co., Alliance, O.
Morgan Engineering Co., The, Alliance, O.
Wellman-Seaver-Morgan Co., The, 7025 Central Ave., Cleveland, O.

CRANES (Crawling, Tractor, Erection, Locomotive)
Brown Hoisting Machinery Co., 4403 St. Clair Ave., Cleveland, O.
Harnischfeger Corp., 88th & National, Milwaukee, Wis.
Industrial Works, Bay City, Mich.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
McMyler-Interstate Co., Bedford, O.
Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.

CRANES (Electric Traveling)
Alliance Machine Co., Alliance, O.
Box, Alfred, Co., Janney & E. Ontario Sts., Philadelphia, Pa.
Cleveland Crane & Engr. Co., The, Wickliffe, O.
Erie Steel Construction Co., The, Erie, Pa.
Harnischfeger Corp., 88th & National, Milwaukee, Wis.
Milwaukee Elec. Crane & Mfg. Corp., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, O.
Niles-Bement-Pond Co., 111 Broadway, New York City.
Roeper Crane & Hoist Works, 1729 No. 10th St., Reading, Pa.
Shepard Electric Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y.

CRANES (Gantry)
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Cleveland Crane & Engrg. Co., The, Wickliffe, O.

CRANES (Hand)
Cleveland Crane & Engineering Co., The, Wickliffe, O.
Roeper Crane & Hoist Works, 1729 No. 10th St., Reading, Pa.

CRANES (Hydraulic)
Alliance Machine Co., Alliance, O.

CRANES (Industrial)
Cleveland Crane & Engineering Co., The, Wickliffe, O.

CRANES (Jib)
Cleveland Crane & Engineering Co., The, Wickliffe, O.
Niles-Bement-Pond Co., 111 Broadway, New York City.

CRANES (Locomotive)
Brown Hoisting Machinery Co., 4403 St. Clair Ave., Cleveland, O.
Browning Crane Co., E. 162nd and Waterloo Rd., Cleveland, Ohio.
Harnischfeger Corp., 88th & National, Milwaukee, Wis.
Industrial Works, Bay City, Mich.
King, Philip T., 50 Church St., New York City.
Link-Belt Co., 910 So. Michigan Ave., Chicago, Ill.
McMyler-Interstate Co., Bedford, O.
Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.

CRANES (Wall)
Milwaukee Electric Crane & Mfg. Corp., Milwaukee, Wis.
Niles-Bement-Pond Co., 111 Broadway, New York City.

CRANK SHAFTS
Champion Machine & Forging Co., The, 3675 E. 78th St., Cleveland, O.

CRUSHING GRINDING AND PULVERIZING MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, O.

CUPRO-VANADIUM
Vanadium Corp. of America, 120 Broadway, New York City.

CUTTING AND WELDING APPARATUS—See WELDING AND CUTTING APPARATUS (Electric)

CUTTING AND WELDING (Oxy-Acetylene Process)—See WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene Process)

CYLINDERS (Acetylene) — See ACETYLENE IN CYLINDERS

CYLINDERS (Acetylene) — See OXYGEN IN CYLINDERS

CYLINDERS (Pressure)
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Scaife, Wm. B., & Sons Co., Oakmont, Pa.

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Oxweld Acetylene Co., 30 E. 42nd St., New York City.

DEOXIDIZERS
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

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American Terry Derrick Co., So. Kearney, N. J.

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Heppenstall Forge & Knife Co., Arsenal Station, Pittsburgh, Pa.

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Marquette Tool & Mfg. Co., The, 319 W. Ohio St., Chicago, Ill.

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DIE SHOES
U. S. Tool Co., Inc., Ampere, N. J.

DIES
Bethlehem Steel Co., Bethlehem, Pa.
Toledo Machine & Tool Co., Toledo, O.
Vanadium Corp. of America, 120 Broadway, New York City.

DIES (Riveters)
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Moeschl-Edwards Const. Co., The, 120 W. 9th St., Covington, Ky.

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Barnes Drill Co., Rockford, Ill.
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Chicago Pneumatic Tool Co., 6 East 44th St., New York City

DRILLS (Pneumatic)
Chicago Pneumatic Tool Co., 6 East 44th St., New York City.
Cleveland Pneumatic Tool Co., 3784 E. 78th St., Cleveland, O.
Ingersoll-Rand Co., 11 Broadway, New York City.

DRILLS (Rock)
Chicago Pneumatic Tool Co., 6 East 44th St., New York City.
Ingersoll-Rand Co., 11 Broadway, New York City.

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Clark Controller Co., The, 1146 E. 152nd St., Cleveland, O.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, Ohio.
General Electric Co., Schenectady, N. Y.

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Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

ELECTRIC TOOLS (Portable)—See TOOLS (Portable Electric)

ELEVATING & CONVEYING MACHINERY — See CONVEYORS (Elevating & Conveying)

ELEVATORS (Bucket)
Bartlett, C. O., & Snow, Co., 6208 Harvard Ave., Cleveland, O.
Link-Belt Co., 910 So. Michigan Ave., Chicago, Ill.

ENGINE LATHES—See LATHES (Engine)

ENGINEERS AND CONTRACTORS
Battey & Kipp, Inc., 123 W. Madison St., Chicago, Ill.
Brassert, H. A., & Co., 310 So. Michigan Ave., Chicago, Ill.
Chapman Engineering Co., Mt. Vernon, O.
Freyn Engineering Co., 310 So. Michigan Ave., Chicago, Ill.
Hagan, George J., Peoples Bank Bldg., Pittsburgh, Pa.
Hagan, George J., Co., Chamber of Commerce Bldg., Pittsburgh, Pa.
Kennedy, Julian, Bessemer Bldg., Pittsburgh, Pa.
Laughlin, Alex, & Co., First National Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Moore, W. E., & Co., Union Bank Bldg., Pittsburgh, Pa.
Pennsylvania Engineering Works, New Castle, Pa.
Phoenix Bridge Co., 20 South 15th St., Philadelphia, Pa.
Pittsburgh Valve, Fdry. & Construction Co., 26th & A. V. Ry., Pittsburgh, Pa.
Smythe, S. R., Co., The, House Bldg., Pittsburgh, Pa.
Sutton-Abramsen Engineering Co., Park Bldg., Pittsburgh, Pa.
Swindell, Wm., & Bros., P. O. Box 1753, Pittsburgh, Pa.

ENGINEERS (Consulting)
American Heat Economy Bureau, 926 Wabash Bldg., Pittsburgh, Pa.
Battey & Kipp, Inc., 123 W. Madison St., Chicago, Ill.
Brassert, H. A., & Co., 310 So. Michigan Ave., Chicago, Ill.
Ellis, Frank L., 2127 Farmers Bank Bldg., Pittsburgh, Pa.
Freyn Engineering Co., 310 So. Michigan Ave., Chicago, Ill.
Kennedy, Julian, Bessemer Bldg., Pittsburgh, Pa.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Moore, W. E., & Co., Union Bank Bldg., Pittsburgh, Pa.
Perin & Marshall, 40 West 40th St., New York City.
Shover, Barton R., 424 Oliver Bldg., Pittsburgh, Pa.
Trundle, Jr., Geo. T., Engineering Co., The, Card Bldg., Cleveland, Ohio.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

It's False Economy

It's false economy to buy cheaper fittings when the dependable "Jarecki" costs so little more.

You may expect years and years of faithful performance from your "Jarecki" fittings and you'll get it.

Specify "Jarecki's" next time.

[Established 1852]

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Jarecki Manufacturing Company
Erie, Penna., U. S. A.

WEBSTER

Mechanical Handling Equipment

Includes

Coal and Ashes Handling Machinery,
Belt Conveyors, Bucket Elevators,
Flight Conveyors, Coal Crushers,
Ash Skip Hoists, Pivoted Bucket Carriers,
Apron Conveyors, Weigh Larries,
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Feeders of All Types,
Screw Conveyors,
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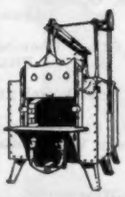
THE LONG AND ALLSTATTER CO.

POWER PUNCHING & SHEARING MACHINERY

AMERICAN PUNCH & SHEAR WORKS — THE QUALITY LINE

HAMILTON, OHIO, U.S.A.



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Hydraulic Machinery
Automatic Gas Producers

R. D. WOOD & CO.
ESTABLISHED 1803
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Catalogues mailed upon request.

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Clutches for Machine Tools

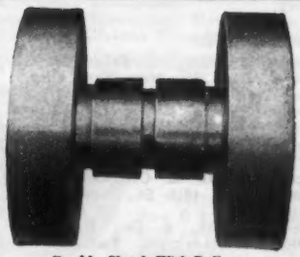
Single Clutch With Pulley

Here is an admirable clutch for machine tools of all kinds. Starts machines quickly, stops them instantly, controls them absolutely.

Single Clutch Exterior

The Johnson is a high grade clutch for lathes, grinders, milling machines, boring mills, automatic screw machines, or for any light powered machine.

Write for White Catalog



Double Clutch With Pulleys

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

ENGINEERS, CONSULTING (By-Product Coke Oven and Gas Plants)
Koppers Co., The, Union Trust Bldg., Pittsburgh, Pa.

ENGINEERS (Management, Production)
Trundle, Jr., Geo. T., Engineering Co., The, Card Bldg., Cleveland, Ohio.

ENGINES (Gas, Oil)
Chicago Pneumatic Tool Co., 8 East 44th St., New York City.
Ingersoll-Rand Co., 11 Broadway, New York City.

ENGINES (Heavy Duty)
Mesta Machine Co., Homestead, Pa.

EXHAUSTERS (Gas)—See GAS EXHAUSTERS

FACTORY EQUIPMENT (Steel)—See STOOLS AND FACTORY EQUIPMENT (Steel)

FACTORY SPECIALISTS
Houston, David, Bond & Co., Inc., 192 Market St., Newark, N. J.
Technical Service Co., Woolworth Bldg., New York City.

FENCE (Chain Link)
Wickwire Spencer Steel Co., Inc., 41 E. 42nd St., New York City.

FENCES—See WIRE FENCES

FERRAOLLOYS
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
Keokuk Electro-Metals Co., Keokuk, Iowa.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Leavitt, C. W., & Co., 30 Church St., New York City.
Metal & Thermit Corp., 120 Broadway, New York City.

FERROCARBON TITANIUM
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

FERROCHROME
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

FERROMANGANESE
Agnew, Batteiger & Co., 1630-32 Widener Bldg., Philadelphia, Pa.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Leavitt, C. W., & Co., 30 Church St., New York City.
Rogers, Brown & Crocker Bros., Inc., 21 E. 40th St., New York City.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

FERROPHOSPHORUS
Rogers, Brown & Crocker Bros., Inc., 21 E. 40th St., New York City.

FERROSILICON
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
Globe Iron Co., Jackson, O.
Keokuk Electro Metals Co., Keokuk, Iowa.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Rogers, Brown & Crocker Bros., Inc., 21 E. 40th St., New York City
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

FERROVANADIUM
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Vanadium Corp. of America, 120 Broadway, New York.

FIRE BRICK AND CLAY
Ashland Fire Brick Co., Ashland, Ky.
Brighton Fire Brick Co., Block House Run, New Brighton, Pa.
Climax Fire Brick Co., Climax, Pa.
Crescent Refractories Co., Curwensville, Clearfield Co., Pa.
Dover Fire Brick Co., 1012 Nat'l City Bank Bldg., Cleveland, O.
Eureka Fire Brick Works, First National Bank Bldg., Pittsburgh, Pa.
France, J. H., Refractories Co., Snow Shoe, Pa.
General Refractories Co., 117 S. 16th St., Philadelphia, Pa.
Haws Refractories Co., Johnstown, Pa.
Hydraulic Press Brick Co., Central National Bank Bldg., St. Louis, Mo.
Kier Fire Brick Co., Oliver Bldg., Pittsburgh, Pa.
Portsmouth Refractories Co., Portsmouth, O.
Queen's Run Refractories Co., Inc., Lock Haven, Pa.
Stowe-Fuller Refractories Co., The, 1650 Union Trust Bldg., Cleveland, O.
Superior Basic Brick Co., 517 Bessemer Bldg., Pittsburgh, Pa.
Union Mining Co., 1113 Fidelity Bldg., Baltimore, Md.
Walsh Fire Clay Products Co., 4070 N. Main St., St. Louis, Mo.

FIRE CLAY (Ground)
General Refractories Co., 117 S. 16th St., Philadelphia, Pa.

FIRE DOORS AND SHUTTERS
Kinnear Mfg. Co., The 818-868 Field Ave., Columbus, O.
Moeschl-Edwards Const. Co., The, 120 W. 9th St., Covington, Ky.

FIXTURES (Lighting)
Thompson Electric Co., 1438 W. 9th St., Cleveland, O.

FLANGES (Pipe)
Dart, E. M., Mfg. Co., Providence, R. I.

FLANGES (Pipe, Forged Steel)
Cann & Saul Steel Co., 516 Commerce St., Philadelphia, Pa.

FLASKS (Foundry)
Truscon Steel Co., Youngstown, O.

FLASKS (Snap)
American Foundry Equipment Co., Mishawaka, Ind.
Diamond Clamp & Flask Co., Richmond, Ind.

FLOORING (Steel, Ventilating, Nonslipping, Fireproof)
Hendrick Manufacturing Co., Carbondale, Pa.
Irving Iron Works, Long Island City, N. Y.

FLOOR PLATES (Rolled Steel)
American Pressed Steel Co., Commercial Trust Bldg., Philadelphia, Pa.

FLUOR SPAR
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Rogers, Brown & Crocker Bros., Inc., 21 E. 40th St., New York City.

FLUX (Welding)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

FORGES
Bradley, C. C., & Sons., Inc., 432 N. Franklin St., Syracuse, N. Y.

FORGING BILLETS
Andrews Steel Co., Newport, Ky.
Central Steel Co., Massillon, O.
Wood, Alan, Iron & Steel Co., Widener Bldg., Philadelphia, Pa.

FORGING BILLETS (Alloy and Carbon Steel)
Central Steel Co., Massillon, O.

FORGING FURNACES
Best, W. N., Corp., 11 Broadway, New York City.
Chapman-Stein Furnace Co., Mt. Vernon, Ohio.

FORGING MACHINERY
Bliss, E. W., Co., 53rd St., and 2nd Ave., Brooklyn, N. Y.
Bradley, C. C., & Son, Inc., 432 N. Franklin St., Syracuse, N. Y.
Makintosh-Hemphill Co., Pittsburgh, Pa.

FORGING (Bronze and Copper)
Chicago Forging & Mfg. Co., 2004 Southport Ave., Chicago, Ill.

FORGINGS (Drop)
Bay City Forge Co., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Canton Forge & Axle Co., 2003-35 Deuber Ave., Canton, Ohio.
Champion Machine & Forging Co., 3675 E. 78th St., Cleveland, O.
Columbus Forge & Iron Co., Columbus, O.
Eccles, Richard, Co., Auburn, N. Y.
Heppenstall Forge & Knife Co., Arsenal Station, Pittsburgh, Pa.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago, Ill.
Oliver Iron & Steel Corp., So. 10th & Muriel Sts., Pittsburgh, Pa.
Philadelphia Steel & Iron Co., Commercial Trust Bldg., Philadelphia, Pa.
Pollak Steel Co., The, Cincinnati, O.
Queen City Forging Co., The, 235 Tennyson St., Cincinnati, O
Rockford Drop Forge Co., Rockford, Ill.
Scranton Drop Forge Co., Scranton, Pa.
Strieby & Foote Co., 301 Ogden St., Newark, N. J.
Wilcox, D., Mfg. Co., Mechanicsburg, Pa.
Williams, J. H., & Co., 400 Vulcan St., Buffalo, N. Y.

FORGINGS (Iron and Steel)
Bay City Forge Co., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa
Bradley, C. C., & Son, Inc., 432 N. Franklin St., Syracuse, N. Y
Cann & Saul Steel Co., 516 Commerce St., Philadelphia, Pa.
Canton Forge & Axle Co., 2003-35 Deuber Ave., Canton, Ohio.
Columbus Forge & Iron Co., Columbus, O.
Commercial Forgings Co., the, 3709 E. 91st St., Cleveland, Ohio.
Eccles, Richard, Co., Auburn, N. Y
Heppenstall Forge & Knife Co. Arsenal Station, Pittsburgh, Pa
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago, Ill.
Leard, Wm., Co., The, New Brighton, Pa.
McMyler-Interstate Co., Bedford, O
Midvale Co., The, Nicetown, Philadelphia, Pa.
Philadelphia Steel & Iron Co. Commercial Trust Bldg., Philadelphia, Pa.
Rockford Drop Forge Co., Rockford, Ill.
Vanadium Corp. of America, 120 Broadway, New York City.
Wilcox, D., Mfg. Co., Mechanicsburg, Pa.

FOUNDRY EQUIPMENT & SUPPLIES
American Foundry Equipment Co., Mishawaka, Ind.
National Engineering Co., 549 W Washington Blvd., Chicago, Ill

FRAMES (Wire Drawing)
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., The, Cuyahoga Falls, O.

FROGS AND SWITCHES
Bethlehem Steel Co., Bethlehem, Pa.

FUEL OIL BURNING SYSTEMS AND PLANTS
Best, W. N., Corp., 11 Broadway, New York City.
Fuller Engineering Co., Fullerton, Pa.
General Furnace Co., Leetsdale, Pa.
Hagan, George J., Co., Chamber of Commerce Bldg., Pittsburgh, Pa.

FURNACE INSULATION
Armstrong Cork & Insulation Co., 101 24th Street, Pittsburgh, Pa.
Celite Products Co., 11 Broadway, New York City.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York City.

FURNACES (Annealing, Case Hardening and Heat Treating)
Best, W. N., Corp., 11 Broadway, New York City.
Chapman-Stein Furnace Co., Mt. Vernon, Ohio.
Combustion Engineering Corp., 43 Broad St., New York City.
Electric Furnace Co., The, 538 Wilson St., Salem, O.
General Furnace Co., 1015 Chestnut St., Philadelphia, Pa.
Hagan, George J., 1105 Peoples Bank Bldg., Pittsburgh, Pa.
Hagan, George J., Co., Chamber of Commerce Bldg., Pittsburgh, Pa.
Strong, Carlisle & Hammond Co., The, 326 Frankfort Ave., Cleveland, Ohio.

FURNACES (Blast)
Brassert, H. A., & Co., 310 So. Michigan Ave., Chicago, Ill.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Mt. Vernon Bridge Co., Mt. Vernon, Ohio.
Pennsylvania Engineering Works, New Castle, Pa.
Riter-Conley Co., Oliver Bldg., Pittsburgh, Pa.

FURNACES (Electric)
Strong, Carlisle & Hammond Co., The, 326 Frankfort Ave., Cleveland, Ohio.
Swindell, Wm., & Brothers Co., P. O. Box 1753, Pittsburgh, Pa.

FURNACES (Electric for Nonferrous Metals)
Electric Furnace Co., The, 538 Wilson St., Salem, O.

FURNACES (Electric Melting)
American Bridge Co., 71 Broadway, New York City.
Electric Furnace Co., The, 538 Wilson St., Salem, O.
General Electric Co., Schenectady, N. Y.
Hagan, George J., Co., Chamber of Commerce Bldg., Pittsburgh, Pa.
Payne, N. B., & Co., 25 Church St., New York, N. Y.
Pittsburgh Electric Furnace Co., 32nd St. and Putney Way, Pittsburgh, Pa.

FURNACES (Open-Hearth)
Chapman-Stein Furnace Co., Mt. Vernon, Ohio.
Laughlin, Alex., & Co., First National Bank Bldg., Pittsburgh, Pa.
Pennsylvania Engineering Works, New Castle, Pa.
Smythe, S. R., Co., House Bldg., Pittsburgh, Pa.
Wellman-Seaver-Morgan Co., The, 7025 Central Ave., Cleveland, O.

FURNACES (Recuperative)
Combustion Engineering Corp., 43 Broad St., New York City.
Electric Furnace Co., The, 538 Wilson St., Salem, O.

GAGES (Welding)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

GALVANIZING
Cattie, Joseph P., & Brothers, Gaul & Letterly Sts., Philadelphia, Pa.
Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh, Pa.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

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CHICAGO RAWHIDE PINIONS

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"TRY SIMONDS GEARS"
Accurately Cut—All Kinds—All Materials
The Simonds Manufacturing Co., PITTSBURGH, Pa.

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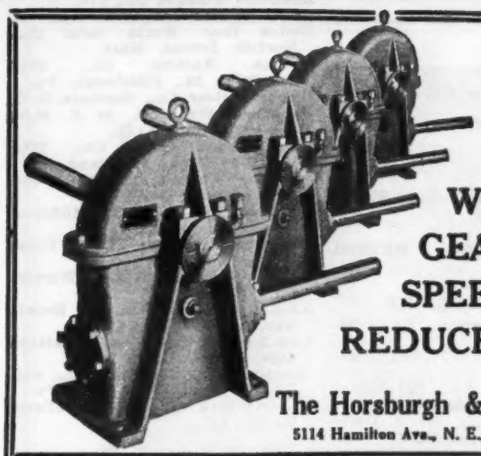
Cut Gears for Industrial and Mill Service

The Akron Gear & Engineering Co.
Akron, Ohio



HIGH CLASS WORM GEAR SPEED REDUCERS

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5114 Hamilton Ave., N. E., Cleveland, O.

For Fifteen Years This Mark AD on GEARS
--has stood for highest quality. We also make Speed-Reducing Units.
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Member American Gear Manufacturers' Association

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Send for catalog.
BOSTON GEAR WORKS SALES CO.
Main Offices and Factories
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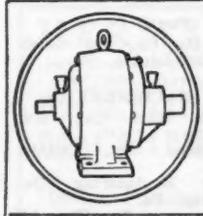
Boston New York Philadelphia Cleveland Chicago

MORGAN
DESIGNERS—MANUFACTURERS—CONTRACTORS
Electric Traveling Cranes, Charging Cranes, Ingot Strippers, Steam Hammers, Drop Hammers, Forging Presses, Hydraulic Presses, Rock Crushers, Rolling Mill Equipment Locomotive Repairing and Rebuilding.
THE MORGAN ENGINEERING CO., ALLIANCE, OHIO



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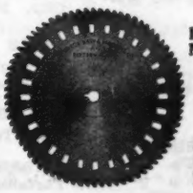
PLANETARY SPUR GEAR SPEED TRANSFORMERS
William Ganschow Company
24 N. Morgan Street - Chicago, Ill.
2002 *CUT GEARS OF ALL KINDS*

SAWS FOR METAL CUTTING
Inserted Tooth; Solid Tooth; Milling; Hot
Pneumatic Hammer Rivet Sets and Chisel Blanks
Hardened Steel Specialties



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Send for our latest catalog.
HUNTER Saw & Machine Co.
57th and Butler St.
Pittsburgh, Pa.

BOWES AIRHOSE COUPLINGS AND CLECO PRESSURE-SEATED VALVES
Are Standard Equipment Everywhere

Absolutely Air Tight
Wire for Bulletin No. 52
Under All Pressures
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GALVANIZING (Hot Dip)
Cattie, Joseph P., & Brothers, Gaul & Letterly Sts., Philadelphia, Pa.
Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh, Pa.

GALVANIZING PLANTS (For Sheets)
Erie Foundry Co., Erie, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.

GANG SLITTERS
Ams, Max, Machine Co., The, 101 Park Ave., New York City.

GAS (Welding and Cutting)
Prest-O-Lite Co., Inc., The, 30 E. 42nd St., New York City.

GAS BOOSTERS (Rotary Positive Pressure)
Connersville Blower Co., The, Connersville, Ind.
Roots, P. H. & F. M., Co., Connersville, Ind.

GAS EXHAUSTERS
Connersville Blower Co., The, Connersville, Ind.
Roots, P. H. & F. M., Co., Connersville, Ind.

GAS HOLDERS
Pennsylvania Engineering Works, New Castle, Pa.

GAS METERS—See METERS (Gas, Air)

GAS PRODUCER PLANTS
Chapman Engineering Co., Mt. Vernon, O.
Cooper, C. & G., Co., Mt. Vernon, O.
Duff Patents Co., Inc., 321 Union Trust Bldg., Pittsburgh, Pa.
Flinn & Dreffein Co., 435 S. Dearborn St., Chicago, Ill.
Hagan, George J., Co., Chamber of Commerce Bldg., Pittsburgh, Pa.
Koppers Co., The, Union Trust Bldg., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J.
Wellman-Seaver-Morgan Co., 7025 Central Ave., Cleveland, O.
Wood, R. D., & Co., 400 Chestnut Ave., Philadelphia, Pa.

GAS RECOVERY COKE OVEN AND GAS PLANTS
Koppers Co., The, Union Trust Bldg., Pittsburgh, Pa.

GEAR BLANKS
Bethlehem Steel Co., Bethlehem, Pa.
Commercial Forgings Co., The, 3700 E. 91st St., Cleveland, Ohio.

GEARS
Boston Gears Works Sales Co., Norfolk Downs, Mass.
Stroh Steel-Hardening Process Co., Westinghouse Bldg., Pittsburgh, Pa.

GEARS (Bakelite)
Ganschow, Wm., Co., 24 N. Morgan St., Chicago, Ill.

GEARS (Bevel-Generated Tooth)
Albaugh-Dover Mfg. Co., 2154 Marshall Blvd., Chicago, Ill.
Ganschow, Wm., Co., 24 N. Morgan St., Chicago, Ill.

GEARS (Cut)
James, D. O., Mfg. Co., 1120 W. Monroe St., Chicago, Ill.

GEARS (Herringbone)
Fawcus Machine Co., 2818 Smallman St., Pittsburgh, Pa.

GEARS (Machine Molded)
Jones, W. A., Foundry & Machine Co., 4437 W. Roosevelt Ave., Chicago, Ill.
Taylor-Wilson Manufacturing Co., McKees Rocks, Pa.

GEARS (Miter, Ring, Spiral, Worm)
Ganschow, Wm., Co., 24 N. Morgan St., Chicago, Ill.

GEARS (Rawhide)
Akron Gear & Eng. Co., The, Akron, Ohio.
Chicago Rawhide Mfg. Co., 1305 Elston Ave., Chicago, Ill.
Ganschow, Wm., Co., 24 N. Morgan St., Chicago, Ill.
Horsburgh & Scott Co., 5114 Hamilton Ave., Cleveland, O.

GEARS (Reverse Marine)
General Electric Co., Schenectady, N. Y.
Johnson, Carlyle, Machine Co., Manchester, Conn.

GEARS AND GEAR CUTTING
Akron Gear & Eng. Co., The, Akron, Ohio.
Albaugh-Dover Mfg. Co., 2154 Marshall Blvd., Chicago, Ill.
American Adamite Co., The, 12th & Etna Sts., Pittsburgh, Pa.
Boston Gear Works Sales Co., Norfolk Downs, Mass.
Fawcus Machine Co., 2818 Smallman St., Pittsburgh, Pa.
Ferguson Gear Co., Gastonia, N. C.
Ganschow, Wm., Co., 24 N. Morgan St., Chicago, Ill.
Horsburgh & Scott Co., 5114 Hamilton Ave., Cleveland, O.
Johnson, Carlyle, Machine Co., Manchester, Conn.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Niles-Bement-Pond Co., 111 Broadway, New York City.
Ross-Meehan Foundries, Chattanooga, Tenn.
Simonds Mfg. Co., 25th St., and Liberty Ave., Pittsburgh, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

GENERATING SETS
General Electric Co., Schenectady, N. Y.

GENERATORS (Acetylene—See ACETYLENE GENERATORS)

GENERATORS (Direct and Alternate Current)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

GLOVES (Abestos)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

GLOVES (Steel Grip)
Industrial Gloves Corp., 1213 Fullerton Ave., Chicago, Ill.

GOGGLES (Welding)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

GRATES (Shaking and Interlocking)
Armstrong Mfg. Co., The, Burt St. and D. T. & I. R. R., Springfield, Ohio.

GRATING-STEEL (Subway, Area, Sidewalk, Ventilation)
Hendrick Manufacturing Co., Carbondale, Pa.
Irving Iron Works, Long Island City, N. Y.

GREASE CUPS (Lubricating)
Berry Automatic Lubricator Corp., 15 Broad St., New York City.

GRINDERS (Crankshaft)
Landis Tool Co., Waynesboro, Pa.

GRINDERS (Electric-Pneumatic-Portable)
Chicago Pneumatic Tool Co., 6 East 44th St., New York City.
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.
Ingersoll-Rand Co., 11 Broadway, New York City.

GRINDERS (Roll)
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES
Farrel-Cheek Steel Foundry Co., Sandusky, O.
Landis Tool Co., Waynesboro, Pa.

GRINDING PANS
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.
Phillips & MacLaren Co., 24th & Smallman Sts., Pittsburgh, Pa.

GUARDS (Truck Radiator)
Irving Iron Works, Long Island City, N. Y.

HAMMERS (Board Drop)
Erie Foundry Co., Erie, Pa.

HAMMERS (Chipping, Riveting and Calking)
Chicago Pneumatic Tool Co., 6 East 44th St., New York City.
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.
Ingersoll-Rand Co., 11 Broadway, New York City.

HAMMERS (Drop)
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Long & Allstatter Co., The, Hamilton, O.
Moloch Co., The, Kaukauna, Wis.
Morgan Engineering Co., The, Alliance, Ohio.
Niles-Bement-Pond Co., 111 Broadway, New York City.
Toledo Machine & Tool Co., Toledo, O.

HAMMERS (Power)
Bradley, C. C., & Son, Inc., 432 No. Franklin St., Syracuse, N. Y.
Cleveland Punch & Shear Works, 3917 St. Clair Ave., Cleveland, O.
Erie Foundry Co., Erie, Pa.
Moloch Co., The, Kaukauna, Wis.
Niles-Bement-Pond Co., 111 Broadway, New York City.
Sutton-Abramsen Engineering Co., Park Bldg., Pittsburgh, Pa.

HAMMERS (Rawhide)
Chicago Rawhide Mfg. Co., 1305 Elston Ave., Chicago, Ill.

HAMMERS (Steam)
Erie Foundry Co., Erie, Pa.
Morgan Engineering Co., The, Alliance, O.

HANGERS (Door)
Myers, F. E., & Brother Co., The, Ashland, Ohio.

HANGERS (Shaft)
Hyatt Roller Bearing Co., Newark, N. J.

HARDNESS TESTING MACHINES
Shore Instrument & Mfg. Co., Van Wyck Ave., & Carll St., Jamaica, N. Y.

HARDWARE
Chicago Forging & Mfg. Co., 2004 Southport Ave., Chicago, Ill.

HARDWOOD (Northern Wisconsin & Michigan)
Northern Hemlock & Hardwood Mfgrs. Assoc., Oshkosh, Wis.

HEAT TREATING (Commercial)
Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland, Ohio.

HEAT TREATING EQUIPMENT
Brown Lynch Scott Co., Monmouth, Ill.

HOISTING MACHINERY
American Terry Derrick Co., So. Kearney, N. J.
Beebe Bros., 3223 First Ave., So. Seattle, Wash.
Brown Hoisting Machinery Co., 4403 St. Clair Ave., Cleveland, Ohio.
Cleveland Crane & Engrg. Co., Wickliffe, O.
Illinois Malleable Iron Co., 1801 Diversy Blvd., Chicago, Ill.
McMyler-Interstate Co., Bedford, O.
Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.
Shepard Electric Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y.
Treadwell Engineering Co., Easton, Pa.

HOISTS (Electric)
Box, Alfred Co., Janney & Ontario Sts., Philadelphia, Pa.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 38th & National, Milwaukee, Wis.
Link-Belt Co., 910 So. Michigan Ave., Chicago, Ill.
Milwaukee Electric Crane & Mfg. Corp., Milwaukee, Wis.
Roeper Crane & Hoist Works, 1720 No. 10th St., Reading, Pa.
Shepard Electric Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y.

HOISTS (Pneumatic)
Chicago Pneumatic Tool Co., 6 East 44th St., New York City.
Hanna Engineering Works, 1766 Elston Ave., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City.

HOOPS AND BANDS
Acme Steel Co., 2840 Archer Ave., Chicago, Ill.
American Tube & Stamping Co., The, Bridgeport, Conn.
Huddart & Baker, Monadnock Bldg., San Francisco, Cal.
Ryerson, Joseph T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
West Leechburg Steel Co., Farmers Bank Bldg., Pittsburgh, Pa.

HOOPS AND BANDS (Strips)
Sharon Steel Hoop Co., Sharon, Pa.

HOSE (Pneumatic)
Chicago Pneumatic Tool Co., 6 East 44th St., New York City.
Ingersoll-Rand Co., 11 Broadway, New York City.

HOSE (Welding)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

HOT BEDS
McKee, Willis, 2422 Euclid Ave., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.

HOT BLAST STOVES
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Riter-Conley Co., Oliver Bldg., Pittsburgh, Pa.

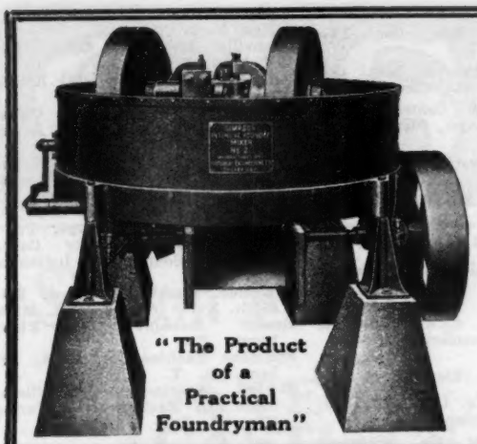
HYDRANTS (Fire)
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.

HYDRAULIC MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Chambersburg Engineering Co., Chambersburg, Pa.
Morgan Engineering Co., The, Alliance, O.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Wood, R. D., Co., 500 Chestnut St., Philadelphia, Pa.

HYDRAULIC PRESSES — See PRESSES (Hydraulic)

INDUSTRIAL HAULAGE EQUIPMENT
General Electric Co., Schenectady, N. Y.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above



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DIAMOND CLAMP & FLASK CO.

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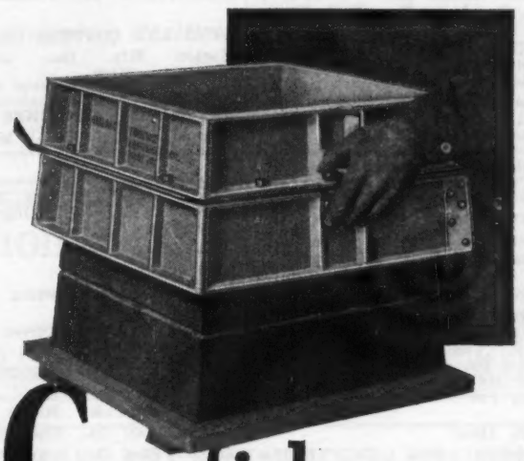

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Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Penn Mold & Mfg. Co., Wheeling, W. Va.
Valley Mould & Iron Corp., Sharpsville, Pa.
Vulcan Mold & Iron Co., Latrobe, Pa.

INSTRUMENTS (Electric Indicating and Recording)
General Electric Co., Schenectady, N. Y.

INSULATING BRICK
Armstrong Cork & Insulation Co., 101 24th St., Pittsburgh, Pa.
Celite Products Co., 11 Broadway, New York City.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York City.

INSULATING POWDER AND CEMENT
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INSULATION (Furnace, Boiler Settings, Ovens, Steam Pipe, Etc.)
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Celite Products Co., 11 Broadway, New York City.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York City.

INSULATORS
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

IRON
Interstate Iron & Steel Co., 104 So. Michigan Ave., Chicago, Ill.
Newport Rolling Mill Co., Newport, Ky.
Penn Iron & Steel Co., Creighton, Pa.

IRON (Bar)
Bethlehem Steel Co., Bethlehem, Pa.
Lockhart Iron & Steel Co., Pittsburgh, Pa.

IRON (Chain)
Bethlehem Steel Co., Bethlehem, Pa.
Penn Iron & Steel Co., Creighton, Pa.

IRON (Engine Bolt)
Bethlehem Steel Co., Bethlehem, Pa.
Penn Iron & Steel Co., Creighton, Pa.

IRON (Norway-Swedish)
Brown-Wales Co., 493 C. St., Boston, Mass.

IRON (Silvery)
Globe Iron Co., Jackson, O.
Keokuk Electro-Metals Co., Keokuk, Iowa.

IRON (Stainless)
Allegheny Steel Co., Brackenridge, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.

IRON (Staybolt)
Bethlehem Steel Co., Bethlehem, Pa.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Penn Iron & Steel Co., Creighton, Pa.

IRON AND STEEL (Swedish)
Brown-Wales Co., 493 C. St., Boston, Mass.
Ljusne-Woxna, Aktiebolag, Ljusne, Sweden.

IRON ORE
Agnew, Batteiger & Co., 1630-32 Widener Bldg., Philadelphia, Pa.
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, Ohio.
Hanna, The M. A., Co., Leader-News Bldg., Cleveland, Ohio.
Hearne, William W., Inc., Real Estate Trust Bldg., Philadelphia, Pa.
Hillman Coal & Coke Co., First National Bank Bldg, Pittsburgh, Pa.
Marquette Ore Co., Rockefeller Bldg., Cleveland, O.
Park & Williams, Inc., Real Estate Trust Bldg., Philadelphia, Pa.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Quinn, Clement K., & Co., Duluth, Minn.
Savage, John A., & Co., Duluth, Minn.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh, Pa.

JIGS AND FIXTURES
Moloch Co., The, Kaukauna, Wis.

JOISTS AND STUDS (Pressed Steel)
Central Steel Co., Massillon, Ohio.
Truscon Steel Co., Youngstown, O.

KEYS AND COTTERS (Machine)
Morton Mfg. Co., Muskegon Heights, Mich.

KEYSEATING MACHINES
Morton Mfg. Co., Muskegon Heights, Mich.

KNIVES AND SHEAR BLADES—See SHEAR BLADES AND KNIVES

LADLES
Pennsylvania Engineering Works, New Castle, Pa.
Riter-Conley Co., Oliver Bldg., Pittsburgh, Pa.
Truscon Steel Co., Youngstown, O.

LATH (Expanded Metal)
Central Steel Co., Massillon, O.
Truscon Steel Co., Youngstown, O.

LATHES
McCabe, J. J., Lathe & Machinery Corp., 149 Broadway, New York City.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

LATHES (Engine)
Wickes Brothers, 820 Water St., Saginaw, Mich.

LATHES (Roll Turnings)
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.
Standard Engineering Co., Ellwood City, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.

LEAD BURNING APPARATUS (Oxy-Acetylene)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

LEAD POTS
Electro Alloys Co., The, Elyria, O.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Strong, Carlisle & Hammond Co., The, 326 Frankfort Ave., Cleveland, O.

LEADER PINS AND BUSHINGS
Danly Machine Specialties, Inc., 4915 N. Lincoln Ave., Chicago, Ill.

LEATHER BELTING—See BELTING (Leather)

LEVELING MACHINES
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.

LIFTING MAGNETS
Cutler-Hammer Mfg. Co., The, Milwaukee, Wis.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O.
Ohio Electric & Controller Co., 5900 Maurice Ave., Cleveland, O.

LIGHTING (Industrial)
Thompson Electric Co., 1438 W. 9th St., Cleveland, O.

LOCK WASHER MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

LOCOMOTIVE CRANES — See CRANES (Locomotive)

LOCOMOTIVES (Electric)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Whitcomb, Geo. D., Rochelle, Ill.

LOCOMOTIVES (Gasoline)
Vulcan Iron Works, 1730 Main St., Wilkes Barre, Pa.
Whitcomb, Geo. D., Co., Rochelle, Ill.

LOCOMOTIVES (Industrial)
Poliakoff, R., 709 Sixth Ave., New York City.
Vulcan Iron Works, 1730 Main St., Wilkes Barre, Pa.
Whitcomb, Geo. D., Co., Rochelle, Ill.

LOCOMOTIVES (Steam)
Poliakoff, R., 709 Sixth Ave., New York City.

LOCOMOTIVES (Storage Battery)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, Ohio.
Baker R. L. Co., The, 2180 W. 25th St., Cleveland, O.

LUBRICATING COMPOUNDS (For Drawing, Stamping, Punching, Perforating, Etc.)
Montgomery, H. A., & Co., Inc., The, 17191 Swift Ave., Detroit, Mich.

LUMBER
Northern Hemlock & Hardwood Mfrs. Assoc., Oshkosh, Wis.

LUMBER (Boxing)
Northern Hemlock & Hardwood Mfrs. Assoc., Oshkosh, Wis.

LUMBER (Crating)
Northern Hemlock & Hardwood Mfrs. Assoc., Oshkosh, Wis.

MACHINE KEYS—See KEYS AND COTTER (Machine)

MACHINERY (Used)
American Foundry & Construction Co., 4700 Second Ave., Pittsburgh, Pa.
Bath, Cyril J., & Co., 6900 Machinery Ave., Cleveland, Ohio.
Eastern Machinery Co., 408 Pearl St., Cincinnati, Ohio.
Emerman, Louis E., & Co., 1765 N. Elston St., Chicago, Ill.
Fitzsimmons & Cole Machinery Co., 1208 House Bldg., Pittsburgh, Pa.
Harris Brothers Co., 35th & Iron Sts., Chicago, Ill.
Lynd-Farquhar Co., Used Tool Dept., Boston, Mass.
McCabe, J. J., Lathe & Machinery Corp., Singer Bldg., New York City.
McCabe & Sheeran Machinery Corp., 50 Church St., New York City.
McCoy-Brandt Machinery Co., 210-14 Penn Ave., Pittsburgh, Pa.
Miles Machinery Co., Saginaw, Mich.
Morey & Co., Inc., 410 Broome St., New York City.
Nashville Industrial Corp., Old Hickory, Tenn.
Niles-Bement-Pond Co., 111 Broadway, New York City.
Niles, F. H., & Co., Inc., Claremont and Mallory Aves., Jersey City, N. J.
Potts, Henry, & Co., 1608 Bankers Trust Bldg., Philadelphia, Pa.
Reliance Machinery Sales Co., 1106 Brighton Rd., Pittsburgh, Pa.
Richey-Whaley Machinery Corp., 23-25 E. South St., Indianapolis, Ind.
Riverside Machinery Depot, 251-65 St. Aubin Ave., Detroit, Mich.
Russell Machine Co., Pittsburgh, Pa.
Simmons Machine Tool Corp., Albany, N. Y.
Wickes Machinery Co., Claremont and Mallory Aves., Jersey City, N. J.

MACHINES (Cutting Off)
Etna Machine Co., 3400 Maplewood Ave., Toledo, O.

MACHINES (Swaging)
Etna Machine Co., 3400 Maplewood Ave., Toledo, O.

MACHINE WORK
Adamson Machine Co., The, Akron, Ohio.
Air Tight Steel Tank Co., Mansion & Gloster Sts., Pittsburgh, Pa.
Akron Gear & Eng. Co., The, Akron, Ohio.
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.
Etna Machine Co., 3400 Maplewood Ave., Toledo, Ohio.
Johnson, Carlyle, Machine Co., Manchester, Conn.
Moloch Co., The, Kaukauna, Wis.
Sutton-Abramsen Engineering Co., Park Bldg., Pittsburgh, Pa.

MAGNESITE (Dead Burned)
General Refractories Co., 117 S. 16th St., Philadelphia, Pa.

MAGNETS (Lifting)—See LIFTING MAGNETS

MANGANESE METALS
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

MANIFOLDS (Oxygen)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

MATERIAL HANDLING MACHINERY
Browning Crane Co., E. 162nd and Waterloo Rd., Cleveland, Ohio.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.
McMyler-Interstate Co., Bedford, O.
Wellman-Seaver-Morgan Co., The, 7025 Central Ave., Cleveland, O.

MERCHANT MILL EQUIPMENT
Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.

METAL (Non-Corrosive)
Du Pont De Nemours, E. I., & Co., Du Pont Bldg., Wilmington, Del.

METAL (Perforated)—See PERFORATED METAL

METAL CLEANER
Ford, J. B., Co., The, Wyandotte, Mich.
Hearne, William W., Inc., Real Estate Trust Bldg., Philadelphia, Pa.

METAL RUST PROOFING
Parker Rust Proof Co., 2184 E. Milwaukee Ave., Detroit, Mich.

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Mundt, Chas., & Sons, Johnston & Fairmount Aves., Jersey City, N. J.

METALS (Heat Resisting)
Mackenzie's, Duncan, Sons Co., Inc., Trenton, N. J.

METALS (Nonferrous)
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

METAL STAMPINGS — See STAMPINGS

METAL WORKING MACHINES—See SHEET METAL WORKING MACHINERY

METERS (Gas and Air)
Connersville Blower Co., The, Connersville, Ind.
Cutler-Hammer Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
Roots, P. H. & F. M., Co., The, Connersville, Ind.

MILLING MACHINES
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

MILLS (Blooming, Universal, Plate, Sheet, Etc.)
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
National Roll & Foundry Co., Avonmore, Pa.
Treadwell Engineering Co., Easton Pa.

MINING MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

MIXERS (Sand)
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.

MIXING, KNEADING, TEMPERING AND PUGGING MACHINERY
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.

MOLDS (Ingot) — See INGOT MOLDS

MOLDING MACHINES
American Foundry Equipment Co., Mishawaka, Ind.
Beardsley & Piper Co., 2541 N. Keeler Ave., Chicago, Ill.
Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill.
Herman Pneumatic Machine Co., 806 Union Bank Bldg., Pittsburgh, Pa.
Holley Carburetor Co., Vancouver & P. M. R. R., Detroit, Mich.

MOLDING MACHINES (Permanent)
Holley Carburetor Co., Vancouver & P. M. R. R., Detroit, Mich.

MOLDING MACHINES (Tractor Type Sand Throwing)
Beardsley & Piper Co., 2541 N. Keeler Ave., Chicago, Ill.

MONEL METAL
Driver-Harris Co., Harrison, N. J.
International Nickel Co., 67 Wall St., New York City.

MOTORS (Electric)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MUCK BAR
Bethlehem Steel Co., Bethlehem, Pa.
Penn Iron & Steel Co., Creighton, Pa.

NAILS
American Steel & Wire Co., 208 S. La Salle St., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Capewell Horse Nail Co., The, Hartford, Conn.
Capewell Horse Nail Co., The, Hartford, Conn.
Columbia Steel Corp., Balfour Bldg., San Francisco, Cal.
Pittsburgh Steel Co., P. O. Box 72, Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

NAILS (Coated and Galvanized)
American Steel Co., Park Bldg., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., The, Youngstown, Ohio.

NAME PLATES (Porcelain Enamel)
Cooper Oven Thermometer Co., Pequabuck, Conn.

NICKEL
American Nickel Corp., Clearfield, Pa.
International Nickel Co., 67 Wall St., New York City.
United States Nickel Co., New Brunswick, N. J.

NICKEL STEEL (Cold Drawn)
Bethlehem Steel Co., Bethlehem, Pa.

NITROGEN (Gas)
Linde Air Products Co., 30 E. 42nd St., New York City.

NUTS
Bethlehem Steel Co., Bethlehem, Pa.
Clark Bros. Bolt Co., Milldale, Conn.
Cleveland Cap Screw Co., The, 2921 E. 79th St., Cleveland, O.
Lake Erie Bolt & Nut Co., 915 E. 63rd St., Cleveland, Ohio.
Milton Mfg. Co., The, Milton, Pa.
Oliver Iron & Steel Corp., So. 10th & Muriel Sts., Pittsburgh, Pa.
Rhode Island Tool Co., Providence, R. I.
Rockford Bolt Co., 220 Mill St., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Wickman Screw Works, 420 Neptune Ave., Pittsburgh, Pa.

OIL BURNING EQUIPMENT
General Furnace Co., Leetsdale, Pa.
Mahr Mfg. Co., Minneapolis, Minn.

OIL (Fuel)—See FUEL OIL

OPEN-HEARTH FURNACES—See FURNACES (Open Hearth)

ORES—CHROME (Lump or Ground)
General Refractories Co., 117 S. 16th St., Philadelphia, Pa.

OVENS (Coke By-Product Recovery)
Koppers Co., The, Pittsburgh, Pa.

OXY-ACETYLENE WELDING AND CUTTING—See WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-acetylene Process)

OXYGEN AND HYDROGEN
International Oxygen Co., Newark, N. J.

OXYGEN IN CYLINDERS
Linde Air Products Co., 30 E. 42nd St., New York City.

PACKING (Leather)
Chicago Rawhide Mfg. Co., 1905 Elston Ave., Chicago, Ill.

PAINT (Resisting)
American Chemical Paint Co., Ambler, Pa.

PAINTS
Truscon Steel Co., Youngstown, O.

PERFORATED METAL
Chicago Perforating Co., 2445 W. 24th Place, Chicago, Ill.
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Harrington & King Perforating Co., The, 5634 Fillmore street, Chicago, Ill.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, Johnston & Fairmount Aves., Jersey City, N. J.

PICKLING COMPOUND
American Chemical Paint Co., Ambler, Pa.
Hearne, William W., Inc., Real Estate Trust Bldg., Philadelphia, Pa.

PICKS, MATTOCKS, ETC.
Oliver Iron & Steel Corp., So. 10th & Muriel Sts., Pittsburgh, Pa.

PIG IRON
Adrian Furnace Co., Du Bois, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Eaton, Rhodes & Co., First National Bank Bldg., Cincinnati, O.
Globe Iron Co., Jackson, O.
Hanna, The M. A., Co., Leader-News Bldg., Cleveland, O.
Illinois Steel Co., 208 So. La Salle St., Chicago, Ill.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Ljusne-Woxna, Aktiebolag, Ljusne, Sweden.
Mohr, J. J., & Son., Bullitt Bldg., Philadelphia, Pa.
Park & Williams, Inc., Real Estate Trust Bldg., Philadelphia, Pa.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Pilling & Co., Inc., 1500 Chestnut St., Philadelphia, Pa.
Rogers, Brown & Crocker Bros., Inc., 21 E. 40th St., New York City.
Savage, John A., & Co., Duluth, Minn.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh, Pa.
Stewart Furnace Co., 1554 Union Trust Bldg., Cleveland, O.
Valley Mould & Iron Corp., Sharpsville, Pa.
Wickwire-Spencer Steel Co., Inc., 41 E. 42nd St., New York City.
Wood, Alan, Iron & Steel Co., Widener Bldg., Philadelphia, Pa.

PILE DRIVERS
Browning Crane Co., E. 168nd and Waterloo Rd., Cleveland, Ohio.
McMyler-Interstate Co., Bedford, O.
Orton & Steinbrenner Co., 608 S. Dearborn St., Chicago, Ill.

PILING (Steel Sheet)
Bethlehem Steel Co., Bethlehem, Pa.
Wemlinger, Inc., 149 Broadway, New York City.
Wemlinger, Inc., 149 Broadway, New York City.

PINIONS—See GEARS AND GEAR CUTTING

PIPE (Cast Iron)
Standard Cast Iron Pipe & Foundry Co., Atlanta, Ga.
United States Cast Iron Pipe & Foundry Co., Burlington, N. J.

PIPE (Riveted Steel)
Abendroth & Root Mfg. Co., Woolworth Bldg., New York City.

PIPE (Spiral Riveted)
Abendroth & Root Mfg. Co., Woolworth Bldg., New York City.

PIPE (Steel)
Central Tube Co., First National Bank Bldg., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE (Welded)
Pittsburgh Piping & Equipment Co., 35th and Charlotte Sts., Pittsburgh, Pa.

PIPE (Wrought Steel)
Central Tube Co., First National Bank Bldg., Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.

PIPE BENDS
Pittsburgh Piping & Equipment Co., 35th & Charlotte Sts., Pittsburgh, Pa.

PIPE BENDING MACHINES
American Pipe Bending Machine Co., 93 Pearl St., Boston, Mass.

PIPE CUTTING AND THREADING MACHINERY
Curtis & Curtis, 316 Garden St., Bridgeport, Conn.
Jarecki Mfg. Co., Erie, Pa.
Landis Machine Co., Waynesboro, Pa.
Standard Engineering Co., Ellwood City, Pa.
Williams Tool Corp., W. 12th & Liberty, Erie, Pa.

PIPE FITTINGS
Illinois Malleable Iron Co., 1301 Diversey Blvd., Chicago, Ill.
Jenkins Bros., 80 White St., New York City.
Pittsburgh Piping & Equipment Co., 35th & Charlotte Sts., Pittsburgh, Pa.
Power Piping Co., 829 Beaver Ave., Pittsburgh, Pa.
Standard Cast Iron Pipe & Foundry Co., Atlanta, Ga.

PIPE MILL MACHINERY
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PIPE STRAIGHTENING MACHINES
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PIPE WRENCHES—See WRENCHES (Pipe)

PIPING CONTRACTORS
Floersheim, B., & Co., 622 Farmers Bank Bldg., Pittsburgh, Pa.
Pittsburgh Pipeing & Equipment Co., 35th & Charlotte Sts., Pittsburgh, Pa.
Power Piping Co., 829 Beaver Ave., Pittsburgh, Pa.

PLANERS AND SHAPERS
Cleveland Punch & Shear Works, 3917 St. Clair Ave., Cleveland, O.
Morton Mfg. Co., Muskegon Heights, Mich.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

PLATE CASTORS
Hyatt Roller Bearing Co., Newark, N. J.

PLATES (Circular and Disk Steel)
Truscon Steel Co., Youngstown, O.

PLATES (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Morris, Wheeler & Co., 30th and Locust St., Philadelphia, Pa.

PLATES (Rolled Steel—Floor)
American Pressed Steel Co., Commercial Trust Bldg., Philadelphia, Pa.
Wood, Alan, Iron & Steel Co., Widener Bldg., Philadelphia, Pa.

PLATES (Sheared and Universal)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.

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Milwaukee, Wis.
Chicago Office: 549 W. Washington St.

Foundrymen's Handbook
309 Pages, 6 x 9 Inches *Price $5.00 (25s.) Postpaid*

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THE FOUNDRY'S famous "Data Sheets" have been compiled and put into book form with much additional information—thus furnishing foundrymen with a reference work by the use of which they can successfully solve any ordinary problem arising in foundry operations. It is a complete compendium and handbook covering every branch of foundry work from estimating the price to cleaning the finished casting.

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Book Department
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Illinois Steel Co., 208 So La Salle St., Chicago, Ill.
Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Morris & Bailey Division, Oliver Iron & Steel Corp., Wilson Station, Pittsburgh, Pa.
Newport Rolling Mill Co., Newport, Ky.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Wood, Alan, Iron & Steel Co., Widener Bldg., Philadelphia, Pa.
Worth Steel Co., Claymont, Del.
Youngstown Sheet & Tube Co., Youngstown, O.

PLATES—(Terne & Tin)—See TIN PLATE

PNEUMATIC DIE CUSHIONS
Marquette Tool & Mfg. Co., The, 819 W. Ohio St., Chicago, Ill.

PNEUMATIC TOOLS—See TOOLS (Pneumatic)

POLES (Tubular Steel)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

PORTABLE LOADERS (Bucket or Belt)
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

POWDERED COAL EQUIPMENT
Combustion Engineering Corp., 43 Broad St., New York City.
Fuller Engineering Co., Fullerton, Pa.

POWER PLANT EQUIPMENT (Used)
Castle & Wilson
1601 Arrot Bldg., Pitstburgh, Pa.

POWER TRANSMISSION
Fafnir Bearing Co., The, New Britain, Conn.
Jones, W. A., Foundry & Machine Co., 4427 W. Roosevelt Ave., Chicago, Ill.
Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

PREHEATING APPARATUS
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

PRESSED METAL—See STAMPINGS

PRESSED STEEL PARTS—See STAMPINGS

PRESSES
Bliss, E. W., Co., 53rd St., and 2nd Ave., Brooklyn, N. Y.
Cleveland Punch and Shear Works, 3917 St. Clair Ave., Cleveland, O.
Erie Foundry Co., Erie, Pa.
Logemann Bros. Co., 3126 Burleigh St., Milwaukee, Wis.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Moloch Co., The, Kaukauna, Wis.
Toledo Machine & Tool Co., Toledo, O.

PRESSES (Die Cutting)
Logemann Bros. Co., 3126 Burleigh St., Milwaukee, Wis.

PRESSES (Forging)
Morgan Engineering Co., The, Alliance, O.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.

PRESSES (Hydraulic)
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machinery Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, O.
Wood, R. D., & Co., 400 Chestnut St., Philadelphia, Pa.

PRESSES (Metal Drawing, Etc.)
Bliss, E. W., Company, 53rd St. and 2nd Ave., Brooklyn, N. Y.

PRESSES (Roofing & Corrugating)
Streine Tool & Mfg. Co., The, New Bremen, Ohio.

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Logemann Brothers Co., 3126 Burleigh Ave., Milwaukee, Wis.

PRESSES (Shaft and Pipe Straightening—Hydraulic)
Logemann Bros. Co., 3126 Burleigh St., Milwaukee, Wis.

PRESSES (Straightening)
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.

PRESSES (Sub)
U. S. Tool Co., Inc., Ampere, N. J.

PRODUCER GAS SYSTEMS—See GAS PRODUCER PLANTS

PUMPS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Connersville Blower Co., The, Connersville, Ind.
Deming Co., The, Salem, Ohio.

PUMPS (Boiler Feed)
Ingersoll-Rand Co., 11 Broadway, New York.

PUMPS (Centrifugal)
Ingersoll-Rand Co., 11 Broadway, New York.

PUMPS (Hand & Power)
Myers, F. E., & Brother Co., The, Ashland, Ohio.

PUMPS (Hydraulic)
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.

PUNCHES (Multiple)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

PUNCHES AND DIES
Marchant, George F., Co., 1434 So. Rockwell St., Chicago, Ill.

PUNCHES & SHEARS (Hand)
Whitney Metal Tool Co., Rockford, Ill.

PUNCHING AND SHEARING MACHINERY
Bliss, E. W., Co., 53rd St. and and 2nd Ave., Brooklyn, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Cleveland Punch & Shear Works, 3917 St. Clair Ave., Cleveland, O.
Long & Allstatter Co., Hamilton, O.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Wickes Brothers, 820 Water St., Saginaw, Mich.

RACKS (Machine)
Ganschow, Wm., Co., 24 N. Morgan St., Chicago, Ill.

RAILS
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Foster, L. B., Co., Pittsburgh, Pa.
Frank, M. K., Union Trust Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.
Richardson & Co., Inc., 518 Oliver Bldg., Pittsburgh, Pa.
Sherwood, E. C., 50 Church St., New York City.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

RAILS (Girder)
Bethlehem Steel Co., Bethlehem, Pa.

REAL ESTATE (Industrial)
McCabe & Sheeran Machinery Corp., 50 Church St., New York City.

REDUCERS (Speed-Worm and Spur) See SPEED REDUCERS (Worm & Spur)

REFRACTORIES
Ashland Fire Brick Co., Ashland, Ky.
Betson Plastic Fire Brick Co., Rome, N. Y.
Bour, L. J., Refractories Co., Inc., The, Scranton, Pa.
Brighton Fire Brick Co., Block House Run, New Brighton, Pa.
Crescent Refractories Co., Curwensville, Pa.
Dover Fire Brick Co., 1012 Nat'l City Bank Bldg., Cleveland, O.
Eureka Fire Brick Works, First National Bank Bldg., Pittsburgh, Pa.
General Refractories Co., 117 S. 16th St., Philadelphia, Pa.
Hydraulic Press Brick Co., Central National Bank Bldg., St. Louis, Mo.
Kier Fire Brick Co., Oliver Bldg., Pittsburgh, Pa.
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Queen's Run Refractories Co., Inc., Lock Haven, Pa.
Savage Mountain Fire Brick Co., Frostburg, Md.
Soisson, Joseph, Fire Brick Co., Connellsville, Pa.
Stowe-Fuller Refractories Co., The, 1650 Union Trust Bldg., Cleveland, O.
Superior Basic Brick Co., 517 Bessemer Bldg., Pittsburgh, Pa.
Union Mining Co., 1113 Fidelity Bldg., Baltimore, Md.
Walsh Fire Clay Products Co., 4070 N. Main St., St. Louis, Mo.

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REINFORCEMENTS (Steel)
Truscon Steel Co., Youngstown, O.

RESISTANCE MATERIAL
Driver-Harris Co., Harrison, N. J.
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RHEOSTATS
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O.

RINGS (Welded Iron & Steel)
Akron-Selle Co., Akron, O.

RINGS (Weldless, Forged)
Cann & Saul Steel Co., 516 Commerce St., Philadelphia, Pa.

RIVET FORGES (oil burning)
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Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill.

RIVETING MACHINERY
Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill.
Shuster, The F. B., Co., New Haven, Conn.
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.

RIVET HEATERS (Electric)
General Electric Co., Schenectady, N. Y.

RIVET SETS
Hunter Saw & Machine Co., 57th and Butler Sts., Pittsburgh, Pa.
Marchant, George F., Co., 1434 S. Rockwell, Chicago, Ill.

RIVETS
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Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago, Ill.
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Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill

ROD MILLS
Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.
Vaughn Machinery Co., The, Cuyahoga Falls, O.

RODS (Acid Resistant)
Alcumite Corp., The, Dayton, O.

RODS (Drill)
Globe Wire Co., Sharpsburg, Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge, Mass.

RODS (Drill High Speed)
Anchor Drawn Steel Co., Latrobe, Pa.

RODS (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.

RODS (Welding—See WELDING RODS

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Kinnear Manufacturing Co., 818-868 Field Ave., Columbus, O.
Moeschl-Edwards Const. Co., The, 120 W. 9th St., Covington, Ky.

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Hyatt Roller Bearing Co., Newark, N. J.
Norma-Hoffmann Bearing Co., Stamford, Conn.

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Adamson Machine Co., The, Akron, Ohio.
Alliance Machine Co., Alliance, O.
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Blake & Johnson Co., The, 185 N. Elm St., Waterbury, Conn.
Hubbard Steel Foundry Co., E. Chicago, Ind.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Kane & Roach, Niagara and Shonnard Sts., Syracuse, N. Y.
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Mesta Machine Co., Homestead, Pa.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., The, Alliance, O.
National Roll & Foundry Co., Avonmore, Pa.
Standard Engineering Co., Ellwood City, Pa.
Sutton-Abramsen Engineering Co., Park Bldg., Pittsburgh, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

ROLLING MILL FURNACES
Chapman-Stein Furnace Co., Mt Vernon, Ohio.

ROLLING MILL MACHINERY
Farrell Foundry & Machine Co., Ansonia, Conn.

ROLLING MILLS (Consulting Engineers)
Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.

ROLLING MILLS (Contracting Engineers)
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, Ohio.

ROLLS
American Adamite Co., The, 12th & Etna Sts., Pittsburgh, Pa.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.

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QUALITY NEWARK, N. J. SERVICE

Mackintosh-Hemphill Co., Pittsburgh, Pa.
Mesta Machine Co., Homestead, Pa.
Pittsburgh Rolls Corp., 41st St. and A. V. Ry., Pittsburgh, Pa.
Standard Engineering Co., Ellwood City, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

ROLLS (Bending and Straightening)
Wickes Brothers, 320 Water St., Saginaw, Mich.

ROLLS (Hardened Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Pittsburgh Rolls Corp., 41st St., and A. V. Ry., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

ROLLS (Sand Chilled and Steel)
Adamson Machine Co., The, Akron, Ohio.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Hubbard Steel Foundry Co., East Chicago, Ind.
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
National Roll & Foundry Co., Avonmore, Pa.
Pittsburgh-Rolls Corp., 41st St., and A. V. Ry., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

ROLLS (Special)
Pittsburgh Rolls Corp., 41st St., and A. V. Ry., Pittsburgh, Pa.

ROLLS (Wood)
Dart, E. M., Mfg. Co., Providence, R. I.

ROOFING AND SIDING (Iron and Steel)
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Newport Rolling Mill Co., Newport, Ky.,

ROPE SOCKETS (Cast Steel)
Chicago Steel Foundry Co., Kedzie Ave. at 37th St., Chicago, Ill.

RUST PREVENTATIVE
American Chemical Paint Co., Ambler, Pa.
Parker Rust Proof Co., 2184 E. Milwaukee Ave., Detroit, Mich.

RUST REMOVING COMPOUND
American Chemical Paint Co., Ambler, Pa.

SAFE ENDS (Boiler Tube)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

SAFETY DEVICES (Electric)
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O.
Thompson Electric Co., 1438 W. 9th St., Cleveland, O.

SAND
Portage Silica Co., The, 602 Stambaugh Bldg., Youngstown, O.
Standard Silica Co., 39 S. LaSalle St., Chicago, Ill.

SAND (Molding)
Rogers, Brown & Crocker Bros., Inc., 21 E. 40th St., New York City.
Standard Silica Co., 39 S. LaSalle St., Chicago, Ill.

SAND (Sandblast)
Portage Silica Co., The, 602 Stambaugh Bldg., Youngstown, O.
Standard Silica Co., 39 S. La Salle St., Chicago, Ill.
United States Silica Co., 122 South Michigan Ave., Chicago, Ill.

SAND (Silica)
Standard Silica Co., 39 S. La Salle St., Chicago, Ill.
United States Silica Co., 122 So. Michigan Ave., Chicago, Ill.

SANDBLAST ABRASIVES Shot and Grit)
Pittsburgh Crushed Steel Co., 61st & A. V. R. R., Pittsburgh, Pa.

SANDBLAST EQUIPMENT AND ACCESSORIES
American Foundry Equipment Co., Mishawaka, Ind.
Pangborn Corporation, P. O. Box 858, Hagerstown, Md.
Sly, W. W., Mfg. Co., 4700 Train Ave., Cleveland, O.

SAND CONVEYING AND HANDLING MACHINERY
Bartlett & Snow, C. O. Co., 6203 Harvard Ave., Cleveland, O.
Link-Belt Co., 910 So. Michigan Ave., Chicago, Ill.

SAND MIXERS, CUTTERS AND SIFTERS
American Foundry Equipment Co., Mishawaka, Ind.
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.

SAND MIXERS (Core and Facing Sand)
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.

SAND RAMMERS
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.

SAND SLINGERS
Beardsley & Piper Co., 2541 N. Keeler Ave., Chicago, Ill.

SASH (Steel Casement)
Truscon Steel Co., Youngstown, O.

SAW SHARPENING MACHINES
Hunter Saw & Machine Co., 57th and Butler Sts., Pittsburgh, Pa.

SAWS (Band)
Thompson, Henry G., & Sons Co., New Haven, Conn.

SAWS (Cold and Hot Metal)
Hunter Saw & Machine Co., 57th and Butler Sts., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.

SAWS (Hack)
Thompson, Henry G., & Sons Co., New Haven, Conn.

SAWS (High Speed Friction)
Ryerson, Jos. T., & Son, Inc., 16 and Rockwell Sts., Chicago, Ill.

SCALES, AUTOMATIC DIAL (Heavy Duty, Bench, Overhead Track, Tank, Hanging, Packing, Counting, Special Purposes)
Fairbanks Co., Broome & Lafayette Sts., New York City.
Fairbanks, Morse Co., Inc., 900 S. Wabash Ave., Chicago, Ill.
Toledo Scale Co., Monroe & Albion Sts., Toledo, O.

SCALES (Dial)
Fairbanks Co., Broome & Lafayette Sts., New York City.
Fairbanks, Morse & Co., 900 Wabash Ave., Chicago, Ill.

SCALES (Industrial Motor, Truck, Railroad Track, Rolling Mill)
Fairbanks Co., Broome & LaFayette Sts., New York City.
Fairbanks, Morse & Co., Inc., 900 S. Wabash Ave., Chicago, Ill.
Howe Scale Co., Rutland, Vt.

SCLEROSCOPES, HARDNESS MEASURING
Shore Instrument & Mfg. Co., Van Wyck Ave. & Carll St., Jamaica, N. Y.

SCRAP
Agnew, Batteiger & Co., 1630-32 Widener Bldg., Philadelphia, Pa.

SCRAP BALING PRESSES
Logemann Bros., Co., 3126 Burleigh St., Milwaukee, Wis.

SCRAP BUNDLING MACHINES (Wire Mills)
Vaughn Machinery Co., The, Cuyahoga Falls, O.

SCREENS
Chicago Perforating Co., 2445 W. 24th Place, Chicago, Ill.
Harrington & King Perforating Co., The, 5634 Fillmore St., Chicago, Ill.
Hendrick Mfg. Co., The, Carbondale, Pa.

SCREENS AND SIEVES
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Mundt, Chas., & Sons, Johnston & Fairmount Aves., Jersey City, N. J.

SCREW MACHINE PRODUCTS
Automatic Products Co., 1145 W. Grand Blvd., Detroit, Mich.
Cleveland Cap Screw Co., The, 2921 E. 79th St., Cleveland, O.
Link-Belt Co., P. O. Box 85, Indianapolis, Ind.
Milford Mfg. Co., The, 33 Buckingham Ave., Milford, Conn.
Morganmade, Keene, N. H.

SCREW STOCK (Cold Drawn)
Lancaster Steel Products Corp., Lancaster, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.

SCREW STOCK (Free Cutting)
Union Drawn Steel Co., Beaver Falls, Pa.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SCREWS
Clark Bros. Bolt Co., Milldale, Conn.
Cleveland Cap Screw Co., The, 2921 E. 79th St., Cleveland, O.
Progressive Mfg. Co., Torrington, Conn

SCREWS (Cap and Heat Treated)
Rhode Island Tool Co. Providence, R. I.

SCREWS (Cold Headed)
Cleveland Cap Screw Co., The, 2921 E. 79th St., Cleveland, O.

SCREWS (Cap & Set)
Automatic Products Co., 1145 W. Grand Blvd., Detroit, Mich.
Cleveland Cap Screw Co., The, 2921 E. 79th St., Cleveland, O.

SEAMERS (Automatic, Double)
Ams, Max, Machine Co., 101 Park Ave., New York City.

SEAMLESS STEEL TUBING— See TUBES (Cold Drawn Seamless Steel)

SEATS (Copper Valve)
Lawrenceville Bronze Co., 518 Bessemer Bldg, Pittsburgh, Pa.

SEPARATORS (Magnetic)
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O.

SHAFT AND PIPE STRAIGHTENERS (Hydraulic)
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.

SHAFT HANGERS
Hyatt Roller Bearing Co., Newark, N. J.
Timken Roller Bearing Co., The, Canton, O.

SHAFTING
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Ryerson, Jos T. & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Vanadium Corp. of America, 120 Broadway, New York City.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAFTING (Cold Drawn)
Union Drawn Steel Co., Beaver Falls, Pa.

SHAFTING (Cold Drawn and Turned)
Bethlehem Steel Co., Bethlehem, Pa.

SHAFTING (Flexible)
Binghamton Flexible Shaft Co., 239-41 Water St., Binghamton, N. Y.
White, S. S., Dental Mfg. Co., The, 211 S. 12th St., Philadelphia, Pa.

SHAFTING (Turned & Polished)
Union Drawn Steel Co., Beaver Falls, Pa.

SHAPERS—See PLANERS AND SHAPERS

SHAPERS
Rockford Machine Tool Co., 2400 Kishwaukee Ave., Rockford, Ill.

SHAPES (Steel)—See STEEL (Structural)

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Bliss, E. W., Co., 53rd St., and 2nd Ave., Brooklyn, N. Y.
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Pittsburgh, Pa.
Morgan Engineering Co., The, Alliance, Ohio.
National Roll & Foundry Co., Avonmore, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Toledo Machine & Tool Co., Toledo, O.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.

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Streine Tool & Mfg. Co., The, New Bremen, Ohio.

SHEARS (Metal Slitting)
Streine Tool & Mfg. Co., The, New Bremen, Ohio.

SHEARS (Plate)
Streine Tool & Mfg. Co., The, New Bremen, Ohio.

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Bethlehem Steel Co., Bethlehem, Pa.
Mansfield Sheet & Tin Plate Co., The, Mansfield, Ohio.

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Shuster, The F. B., Co., New Haven, Conn.

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Crosby Co., 183 Pratt St., Buffalo, N. Y.

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Ams, Max, Machine Co., 101 Park Ave., New York City.
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Streine Tool & Mfg. Co., The, New Bremen, Ohio.
Toledo Machine & Tool Co., Toledo, Ohio.

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Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.

SHEETS
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Apollo Steel Co., Apollo, Pa.

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SHEETS (Acid Resistant)
Alcumite Corp., The, Dayton, O.

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american Sheet & Tin Plate Co., Frick Eldg., Pittsburgh, Pa.
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Mansfield Sheet & Tin Plate Co., The, Mansfield, O.
Newton Steel Co., Youngstown, O.
Seneca Iron & Steel Co., Buffalo, N. Y.

SHEETS (Black)
Allegheny Steel Co., Brackenridge, Pa.
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Mansfield Sheet & Tin Plate Co., The, Mansfield, Ohio.
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Newport Rolling Mills Co., Newport, Ky.
Newton Steel Co., Youngstown, O.
Reeves Mfg. Co., Dover, Ohio.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16 and Rockwell Sts., Chicago, Ill.
Seneca Iron & Steel Co., Buffalo, N. Y.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

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American Rolling Mill Co., Middletown, Ohio.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Apollo Steel Co., Apollo, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Central Steel Co., Massillon, O.
Mansfield Sheet & Tin Plate Co., The, Mansfield, Ohio.
Morris, Wheeler & Co., 30th and Locust St., Philadelphia, Pa.
Newport Rolling Mill Co., Newport, Ky.
Newton Steel Co., Youngstown, O.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16 and Rockwell Sts., Chicago, Ill.
Sharon Steel Hoop Co., Sharon, Pa.
Tennessee Coal, Iron & Railroad Co., 1351 Brown-Marx Bldg., Birmingham, Ala.
Trumbull Steel Co., The, Warren, Ohio
Wood, Alan, Iron & Steel Co., Widener Bldg., Philadelphia, Pa.

SHEETS (Box Annealed)
Sharon Steel Hoop Co., Sharon, Pa.

SHEETS (Cold Rolled)
Newton Steel Co., Youngstown, O.

SHEETS (Corrugated)
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Reeves Mfg. Co., Dover, O.
Weirton Steel Co., Weirton, W. Va.

SHEETS (Deep Stamping)
Allegheny Steel Co., Brackenridge, Pa.
Newton Steel Co., Youngstown, O.

SHEETS (Electrical)
Allegheny Steel Co., Brackenridge, Pa.
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Central Steel Co., Massillon, O.
Mansfield Sheet & Tin Plate Co., The, Mansfield, O.
Trumbull Steel Co., The, Warren, O.

SHEETS (Galvanized)
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
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Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
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Erdle Perforating Co., 171 York St., Rochester, N. Y.

SHEETS (Pickled)
Newton Steel Co., Youngstown, O.

SHEETS (Roofing)—See ROOFING AND SIDING

SHEETS (Steel)
Ducommon Corporation, 219 S. Central Ave., Los Angeles, Cali.

SHEETS (Tin)—See TIN PLATE

SHELVING (Steel)
Cleveland Wire Spring Co., The, 1281 E. 38th St., Cleveland, O.

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SKELP (Iron)
Reeves Mfg. Co., Dover, Ohio.

SLABS
Andrews Steel Co., Newport, Ky.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Mansfield Sheet & Tin Plate Co., The, Mansfield, Ohio.

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Tempest Fire Brick Co., Ltd., The, House Bldg., Pittsburgh, Pa.

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Blake & Johnson Co., The, 185 N. Elm St., Waterbury, Conn.

SOAKING PITS
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Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

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Central Steel Products Co., Clinton, Iowa.
Lammert & Mann Co., Chicago, Ill.
Moloch Co., The, Kaukauna, Wis.
Morgan Engineering Co., The, Alliance, O.
National Roll & Foundry Co., Avonmore, Pa.
Pennsylvania Engineering Works, New Castle, Pa.
Smith Gas Engineering Co., Dayton, Ohio.
Sutton-Abramsen Engineering Co., Park Bldg., Pittsburgh, Pa.
Wellman-Seaver Morgan Co., 7025 Central Ave., Cleveland, O.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

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Sharon Steel Hoop Co., Sharon, Pa.

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Union Drawn Steel Co., Beaver Falls, Pa.

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Jones, W. A., Foundry & Machine Co., 4437 W. Roosevelt Rd., Chicago, Ill.

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Ganschow, Wm., Co., 24 N. Morgan St., Chicago, Ill.
James, D. O., Mfg. Co., 1120 W. Monroe St., Chicago, Ill.

SPIEGELEISEN
Leavitt, C. W., & Co., 30 Church St., New York City.
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Rogers, Brown & Crocker Bros., Inc., 21 E. 40th St., New York City.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

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Illinois Steel Co., 208 So. La Salle St., Chicago, Ill.

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American Spring & Mfg. Co., Elm St., Holly, Mich.
Barnes-Gibson-Raymond, Inc., 6400 Miller Ave., Detroit, Mich.
Cleveland Wire Spring Co., The, 1281 E. 38th St., Cleveland, O.
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Fort Pitt Spring & Mfg. Co., P. O. Box 917, Pittsburgh, Pa.
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Wickwire-Spencer Steel Co., Inc., 41 E. 42nd St., New York City.

SPRINGS (Coil & Elliptic)
Fort Spring & Mfg. Co., McKees Rocks, Pa.

SPRINGS (Coil and Flat)
American Spring & Mfg. Co., Elm St., Holly, Mich.
Barnes-Gibson-Raymond, Inc., 4200 Miller Ave., Detroit, Mich.
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Cleveland Wire Spring Co., The, 1281 E. 38th St., Cleveland, O.
Cook Spring Co., Ann Arbor, Mich.

SPRUE CUTTERS
Shuster, The F. B., Co., New Haven, Conn.

STACKS (Steel)
American Bridge Co., The, 71 Broadway, New York City.
Hendrick Manufacturing Co., Carbondale, Pa.
Morgan Engrg. Co., The, Alliance, Ohio.
Sotter Bros., Inc., Pottstown, Pa.
Truscon Steel Co., Youngstown, O.

STAMPINGS
American Spring & Mfg. Co., Elm St., Holly, Mich.
American Tube & Stamping Co., The, Bridgeport, Conn.
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Crosby Co., 183 Pratt St., Buffalo, N. Y.
GGG Metal Stamping Co., Dept. D., Warren, Pa.
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Truscon Steel Co., Youngstown, O.

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Chicago Forging & Mfg. Co., 2004 Southport Ave., Chicago, Ill.

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Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, Ohio.

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Central Steel Co., The, Massillon, Ohio.
Gulf States Steel Co., Birmingham, Ala.
Illinois Steel Co., 208 So. La Salle St., Chicago, Ill.
Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago, Ill.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.
Pacific Coast Steel Co., Rialto Bldg., San Francisco, Cal.
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Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
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Bethlehem Steel Co., Bethlehem, Pa.

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Union Drawn Steel Co., Beaver Falls, Pa.

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Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Hawkridge Bros., 303 Congress St., Boston, Mass.

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Pittsburgh Cold Rolled Steel Co., Verona, Pa.

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STEEL (Drill)
Ziv Steel & Wire Co., 4423 W. Kinzie St., Chicago, Ill.

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Allen, Edgar, Steel Co., Inc., 718-722 W. Lake St., Chicago, Ill.
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Latrobe Electric Steel Co., Latrobe, Pa.
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Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge, Mass.

STEEL (Open Hearth)
Central Steel Co., Massillon, Ohio.
Gulf States Steel Co., Brown-Marx Bldg., Birmingham, Ala.
Washburn Wire Co., Phillipsdale, R. I.

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Lancaster Steel Products Corp. Lancaster, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.

STEEL (Rustless)
Firth-Sterling Steel Co., McKeesport, Pa.

STEEL (Screw Stock)
Superior Steel Products Co., Monaca, Pa.

STEEL (Spring)
Bethlehem Steel Co., Bethlehem, Pa.
Central Steel Co., Massillon, Ohio.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.

STEEL (Stainless)
Allegheny Steel Co., Brackenridge, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.

STEEL (Stamping and Drawing)
Columbia Steel Co., Elyria, Ohio.
Griffin Mfg. Co., 15th and Cherry Sts., Erie, Pa.
Superior Steel Corp., Union Trust Bldg., Pittsburgh, Pa.

STEEL (Strip, Hot and Cold Rolled)
Acme Steel Co., 2840 Archer Ave., Chicago, Ill.
American Tube & Stamping Co., The, Bridgeport, Conn.
Central Steel Co., Massillon, Ohio.
Columbia Steel Co., The, Elyria, O.
Driver-Harris Co., Harrison, N. J.
Griffin Mfg. Co., 15th and Cherry Sts., Erie, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Lancaster Steel Products Corp., Lancaster, Pa.
Morris & Bailey Division, Oliver Iron & Steel Corp., Wilson Station, Pittsburgh, Pa.
Pittsburgh Cold Rolled Steel Co., Verona, Pa.
Pittsburgh Cold Rolled Steel Co., Verona, Pa.
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Stanford Steel Corp., Milford, Conn.
Superior Steel Corp., Union Trust Bldg., Pittsburgh, Pa.
Trumbull Steel Co., The, Warren, Ohio.
Weirton Steel Co., Weirton, W. Va.
West Leechburg Steel Co., Farmers Bank Bldg., Pittsburgh, Pa.

STEEL (Structural)
Alliance Structural Co., Alliance, Ohio.
American Bridge Co., 71 Broadway, New York City.
Belmont Iron Works, 22nd & Washington Ave., Philadelphia, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Eichleay, John, Jr., Co., So. 20th and Wharton, Pittsburgh, Pa.
Erie Steel Construction Co., The, Erie, Pa.
Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago, Ill.
Kratzer, W. N., Co., 3212 Smallman St., Pittsburgh, Pa.
McClintic-Marshall Co., Oliver Bldg., Pittsburgh, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Moss, J. R., Iron Works, Wheeling, W. Va.
Moss, J. E., Iron Works, Wheeling, W. Va.
Ohio Structural Steel Co., The Newton Falls, Ohio.
Pacific Coast Steel Co., Rialto Bldg., San Francisco, Cal.
Phillips, F. R., & Sons Co., Pennsylvania Bldg., Philadelphia, Pa.
Phoenix Iron Co., The, 20 So. 15th St., Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, Ohio.
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Snead Architectural Iron Works, Louisville, Ky.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Truscon Steel Co., Youngstown, O.
Wallace Equipment Co., 11th St., S. W. & Hanford, Seattle, Wash.

STEEL (Tool)
Allen, Edgar, Steel Co., Inc., 718-722 W. Lake St., Chicago, Ill.
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Driver-Harris Co., Harrison, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Hawkridge Bros., 303 Congress St., Boston, Mass.
Kidd Drawn Steel Co., Aliquippa, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Vanadium Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., 128 Sidney St., Cambridge, Mass.
Ziv Steel & Wire Co., 4423 W. Kinzie St., Chicago, Ill.

STEEL BUILDINGS—See BRIDGES, BUILDINGS AND VIADUCTS

STEEL CARBON
Bethlehem Steel Co., Bethlehem, Pa.

STEEL DOORS AND SHUTTERS
Kinnear Manufacturing Co., 518-868 Field Ave., Columbus, O.

STEEL FABRICATORS—See BRIDGES, BUILDINGS, VIADUCTS (Steel)

STEEL PLATE CONSTRUCTION
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Hammond Iron Works, Warren, Pa.
Hendrick Manufacturing Co., Carbondale, Pa.
Pennsylvania Engineering Works, New Castle, Pa.
Petroleum Iron Works Co., Sharon, Pa.
Riter-Conley Co., Oliver Bldg., Pittsburgh, Pa.
Sotter Bros., Inc., Pottstown, Pa.
Steel Plate Products Co., Pottstown, Pa.

STEEL PLATES—See PLATES (Iron and Steel)

STEEL STAMPINGS—See STAMPINGS

STENCIL CUTTING MACHINES
Bradley Stencil Machine Co., 3740 Forest Park Blvd., St. Louis, Mo.

STEPS (Ladder and Stair, Non-slipping)
Hendrick Manufacturing Co., Carbondale, Pa.
Irving Iron Works, Long Island City, N. Y.

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Armstrong Mfg. Co., The Burt St. & D. T. & I. R. R., Springfield, Ohio.
Babcock & Wilcox Co., The, 85 Liberty St., New York.
Combustion Engineering Corp., 43 Broad St., New York City.
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Riley Stoker Corp., Worcester, Mass.

STOOLS AND FACTORY EQUIPMENT (Steel)
Cleveland Wire Spring Co., The, 1281 E. 38th St., Cleveland, O.

STRAIGHTENING MACHINERY
Kane & Roach, Niagara and Shonnard Sts., Syracuse, N. Y.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
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Sutton-Abramsen Engineering Co., Park Bldg., Pittsburgh, Pa.

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Blake & Johnson Co., The, 185 N. Elm St., Waterbury, Conn.
Treadwell Engineering Co., Easton, Pa.

STRIP STEEL STRAIGHTENERS
Shuster, The F. B., & Co., New Haven, Conn.

STRIP (Steel & Cold Rolled)—See STEEL (Strip, Hot or Cold Rolled)

STRUCTURAL IRON AND STEEL WORK—See STEEL (Structural)

SUB-PRESSES—See Presses (Sub.)

SULPHURIC ACID
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, Ohio.
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Bethlehem Steel Co., Bethlehem, Pa.

SWITCHES (Electric)
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TANKS
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Petroleum Iron Works Co., Sharon, Pa.
Riter-Conley Co., Oliver Bldg., Pittsburgh, Pa.
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Sotter Bros., Inc., Pottstown, Pa.
Steel Plate Products Co., Pottstown, Pa.

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Hauser-Stander Tank Co., Ammen & B. & O. R. R., Cincinnati, Ohio.

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Hauser-Stander Tank Co., Amen & B. & O. R. R., Cincinnati, Ohio.

TANKS—WOOD (Rubber or Lead Lined)
Hauser-Stander Tank Co., Amen & B. & O. R. R., Cincinnati, Ohio.

TANKS—WOOD (Water, Acid, Pickling)
Hauser-Stander Tank Co., Amen & B. & O. R. R., Cincinnati, Ohio.

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Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

TAPS AND DIES
Landis Machine Co., Waynesboro, Pa.

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Weirton Steel Co., Weirton, W. Va.

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Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

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Landis Machine Co., Waynesboro, Pa.
Williams Tool Corp., W. 12th St., & Liberty, Erie, Pa

TIE PLATES
Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.

TIN PLATE
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Mansfield Sheet & Tin Plate Co., Mansfield, Ohio.
Trumbull Steel Co., The, Warren, Ohio.
Weirton Steel Co., Weirton, W. Va.

TIN PLATE MILL EQUIPMENT
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.

TITANIUM
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

TOOL BITS (High Speed)
Firth-Sterling Steel Co., McKeesport, Pa.

TOOLS (Pneumatic)
Chicago Pneumatic Tool Co., 6 E. 44th St., Chicago, Ill.
Cleveland Pneumatic Tool Co., 8734 E. 78th St., Cleveland, O.
Ingersoll-Rand Co., 11 Broadway, New York City.

TOOLS (Portable Electric)
Chicago Pneumatic Tool Co., 6 East 44th St., New York.

TORCHES AND BURNERS (Acetylene, Blow, Oxy-Acetylene)
Oxweld Acetylene Co., Newark, N. J.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

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Erie Hammers are not the cheapest

—we admit it.

but they are the least expensive.

—and we can prove it.

Get the idea?

ERIE FOUNDRY CO.

ERIE, PENNA., U. S. A.

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Have Your Forgings made in Rockford—

We can save you money—give you accurate high grade forgings promptly and in quantities. Send samples or blue prints for quotations.

ROCKFORD DROP FORGE CO.
ROCKFORD, ILLINOIS

KROPP FORGE CO.

K

DROP AND HAMMER FORGINGS
HEAVY and LIGHT
CHICAGO, ILL.

Forgings

4 Ounces to 4 Tons

Small difficult pieces are produced quickly, as well as work of larger size. We can save you money where the production of forgings is involved. Learn all about our reliable service on this work. *Write!*

Highest quality materials and workmanship

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3705 E. 91st Street
CLEVELAND, OHIO

Accuracy, dependability and prompt delivery

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DIE BLOCKS
SHEAR KNIVES

Heppenstall Forge & Knife Co.
Pittsburgh WORKS Bridgeport
Offices in Principal Cities

TORCHES (Oil burning)
Mahr Mfg. Co., Minneapolis, Minn.

TOWERS (Transmission)
American Bridge Co., 71 Broadway, New York City.
Pacific Coast Steel Co., Rialto Bldg., San Francisco, Cal.

TRAMRAILS
Cleveland Crane & Engineering Co., The, Wickliffe, O.
Harnischfeger Corp., 38th & National, Milwaukee, Wis.

TRANSFORMERS (Speed)
Ganschow Co., Wm., 24 N. Morgan St., Chicago, Ill.

TREADS (Nonslipping)
Hendrick Manufacturing Co., Carbondale, Pa.
Irving Iron Works, Long Island City, N. Y.

TREADS (Stair)
Hendrick Manufacturing Co., Carbondale, Pa.

TROLLEYS
Cleveland Crane & Eng. Co., Wickliffe, O.
Milwaukee Electric Crane & Mfg. Corp., Milwaukee, Wis.
Roeper Crane & Hoist Works, 1729 No. 10th St., Reading, Pa.
Shepard Electric Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y.

TRUCKS (Elevating)
Baker R. L. & Co., The, 2180 West 25th St., Cleveland, Ohio.

TRUCKS (Welding)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

TRUCKS & TRACTORS (Electric Industrial)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.
Baker R. L. & Co., The, 2180 West 25th St., Cleveland, O.

TUBE MILL MACHINERY
Standard Engineering Co., Ellwood City, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.

TUBES
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
S. F. Steel Products Co., Call Bldg., San Francisco, Cal.
Timken Roller Bearing Co., The, Canton, O.
Tyler Tube & Pipe Co., The, Washington, Pa.

TUBES (Boiler)
Babcock & Wilcox Tube Co., Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Keating, E. F., Co., 446-54 Water St., New York City.
Morris, Wheeler & Co., 30th and Locust St., Philadelphia, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Williams & Co., Inc., 901 Pennsylvania Ave., Pittsburgh, Pa.

TUBES (Charcoal Iron Boiler)
Bethlehem Steel Co., Bethlehem, Pa.
Tyler Tube & Pipe Co., The, Washington, Pa.

TUBES (Cold Drawn Seamless Steel)
Babcock & Wilcox Tube Co., Beaver Falls, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Summerill Tubing Co., Bridgeport, Pa.
Timken Roller Bearing Co., The, Canton, O.

TUBES (Lap-Welded Boiler)
Allegheny Steel Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Tyler Tube & Pipe Co., The, Washington, Pa.

TUBING (Seamless Steel and Lap-Welded)
Keating, E. F., Co., 446-54 Water St., New York City.
National Tube Co., Frick Bldg., Pittsburgh, Pa.

TUMBLING BARREL EQUIPMENT
Sly, W. W., Mfg. Co., 4700 Train Ave., Cleveland, O.

TURBINES (Steam)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

TURBO BLOWERS—See BLOWERS

TURNBUCKLES
Merrill Brothers, Maspeth, N. Y.

TURNTABLES
American Bridge Co., 71 Broadway, New York City.

TUYERES
Climax Fire Brick Co., Climax, Pa.
Keystone Bronze Co., 39th St., Pittsburgh, Pa.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.

TWIST DRILLS—See DRILLS (Twist)

UNIONS (Pipe)
Dart, E. M., Co., Providence, R. I.
Illinois Malleable Iron Co., 1801 Diversey Blvd., Chicago, Ill.

VALVES (Back Pressure)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

VALVES (Gas and Air Reversing)
McKee, Willis, 2422 Euclid Ave., Cleveland, O.
Morgan Construction Co., Worcester, Mass.

VALVES (Hydraulic)
Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

VALVES (Pneumatic)
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.

VALVES AND FITTINGS
Jarecki Mfg. Co., Erie, Pa.
Jenkins Brothers, 80 White St., New York City.
Pittsburgh Valve, Fdry. & Construction Co., 26th & A. V. Ry., Pittsburgh, Pa.

VALVES, BLAST FURNACE (Copper)
Lawrenceville Bronze Co., 518 Bessemer Bldg., Pittsburgh, Pa.

VANADIUM
Vanadium Corp. of America, 120 Broadway, New York City.

VIADUCTS (Steel)—See BRIDGES, BUILDINGS AND VIADUCTS

VISES
Jarecki Mfg. Co., Erie, Pa.

WALK WAYS (Open Steel)
Irving Iron Works, Long Island City, N. Y.

WAREHOUSES (Iron and Steel)
Bliss & Laughlin, Inc., Harvey, Ill.
Hawkridge Bros., 503 Congress St., Boston, Mass.
Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago, Ill.
Ryerson, Jos. T., Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Union Drawn Steel Co., Beaver Falls, Pa.

WASHERS (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Oliver Iron & Steel Corp., So. 10th & Muriel Sts., Pittsburgh, Pa.

WASHERS (Leather)
Chicago Rawhide Mfg. Co., 1305 Elston Ave., Chicago, Ill.

WASHERS (Wrought)
Joliet Wrought Washer Co., Joliet, Ill.

WASHING MATERIAL (Rags)
Ford, The J. B., Co., Wyandotte, Mich.

WATER FILTRATION AND SOFTENING
Scaife, Wm. B., & Sons Co., Oakmont, Pa.

WATER SYSTEMS
Myers, F. E., & Brother Co., The, Ashland, Ohio.

WAX (Core Wire Pattern Vent)
United Compound Co., 228 Elk St., Buffalo, N. Y.

WELDING AND CUTTING APPARATUS (Electric)
Allan Mfg. & Welding Co., 726 Washington St., Buffalo, N. Y.
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene)
International Oxygen Co., Newark, N. J.
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

WELDING AND CUTTING GAS
Prest-O-Lite Co., Inc., The, 30 E. 42nd St., New York City.

WELDING FLUX (Iron, Brass, Steel) See FLUX (Welding)

WELDING RODS AND WIRE
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

WELDING SUPPLIES
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

WELDING WIRE
Roeblings, John A., Sons Co., Trenton, N. J.

WHEELS (Car and Locomotive)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.
Stroh Steel Hardening Process Co., Westinghouse Bldg., Pittsburgh, Pa.

WINDOWS FIRE PROOF (Hollow Metal)
Moeschl-Edwards Const. Co., The, 120 W. 9th St., Covington, Ky.

WIRE
American Steel Co., Park Bldg., Pittsburgh, Pa.
Interstate Iron & Steel Co., 104 So. Michigan Ave., Chicago, Ill.
Washburn Wire Co., Inc., 118th and Harlem River, New York City.

WIRE (Annealed, Bright, Galvanized)
Bethlehem Steel Co., Bethlehem, Pa.
Pittsburgh Steel Co., P. O. Box 72, Pittsburgh, Pa.

WIRE (Electric Resistance)
Driver-Harris Co., Harrison, N. J.

WIRE (Fence)
American Steel & Wire Co., 208 S. La Salle St., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Pittsburgh Steel Co., P. O. Box 72, Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE (Round, Flat, Square and Special Shapes)
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE (Threaded)
Progressive Mfg. Co., Torrington, Conn.

WIRE (Welding)—See WELDING RODS

WIRE CLOTH
Cleveland Wire Cloth & Mfg. Co., 3571 East 78th St., Cleveland, O.
Wickwire-Spencer Steel Co., Inc., 41 E. 42nd St., New York City.

WIRE DRAWING MACHINERY (Continuous)
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE FORMS
American Spring & Mfg. Co., Elm St., Holly, Mich.

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Shuster, The F. B., Co., New Haven, Conn.
Treadwell Engineering Co., Easton, Pa.

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Morgan Construction Co., Worcester, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., The Cuyahoga Falls, O.

WIRE NAIL MACHINERY
National Machinery Co., Tiffin, O.
Vaughn Machinery Co., The, Cuyahoga Falls, O.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE NAILS—See NAILS

WIRE POINTERS (Roll)
Sleeper & Hartley, Inc., Worcester, Mass

WIRE RODS
Bethlehem Steel Co., Bethlehem, Pa.

WIRE ROPE
American Steel & Wire Co., 208 So. La Salle St., Chicago, Ill.
Roebling's John A., Sons Co., Trenton, N. J.

WIRE ROPE FITTINGS
American Steel & Wire Co., 208 So. LaSalle St., Chicago, Ill
Roeblings, John A., Sons Co., Trenton, N. J.

WIRE ROPE SLINGS
Roeblings, John A., Sons Co., Trenton, N. J.

WIRE STRAIGHTENING AND CUTTING MACHINES
Shuster, The F. B., Co., New Haven, Conn.

WIRE, WIRE RODS AND WIRE PRODUCTS
American Steel & Wire Co., 208 So. La Salle St., Chicago, Ill.
Columbia Steel Corp., Balfour Bldg., San Francisco, Cal.
Gulf States Steel Co., Brown-Marx Bldg., Birmingham, Ala.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Wickwire-Spencer Steel Co., Inc., 41 E. 42nd St., New York City.

WRENCHES
Williams, J. H., & Co., 400 Vulcan St., Buffalo, N. Y.

ZINC (Chloride Dust)
New Jersey Zinc Co., Front and Maiden Lane, New York City.

ZINC (Slab Spelter)
New Jersey Zinc Co., Front and Maiden Lane, New York City.

ZINC (Strips, Sheets, Plates)
New Jersey Zinc Co., Front and Maiden Lane, New York City.

ZIRCONIUM METAL AND ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

FORGINGS

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6" TO 60"
Gear Ring Blanks · Sprocket Blanks
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Turntable Blanks for Derricks
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The AKRON-SELLE Co.
"40 Years in Business"
AKRON, OHIO

Forgings
Crankshafts
Connecting Rods
Shafting
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SMALL DROP FORGINGS
Plants centrally located and specially equipped to manufacture high quality drop forgings, up to 6 lbs.
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Automobile, Railroad and General
From Smallest to Largest
Upset and Machined Forgings
CANTON FORGE AND AXLE COMPANY
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STEEL & IRON FORGINGS ALL SIZES & SHAPES
Shafts
Hooks
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Forged Steel Pipe Flanges
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Offices: 1008 Commercial Trust Bldg.
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SUPERIOR DROP-FORGINGS
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DROP-FORGINGS TO ORDER
J. H. WILLIAMS & CO. *"The Drop-Forging People"*
New York BUFFALO Chicago

Drop Forgings to Order
THE SCRANTON FORGING CO.
SCRANTON, PA.

AUTOMOBILE AND SPECIAL
DROP FORGINGS
Small or medium sized parts our specialty.
Reliable forgings and service guaranteed.
Send Models or blue prints for quotations.
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This book illustrates and describes hundreds of typical grinding operations, giving full data as to the wheels used, grinding output, methods of handling, etc. It also illustrates and describes a variety of special fixtures and appliances for handling grinding room work. As a ready reference book, it is invaluable for checking production figures by the representative operations included.
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The most desirable results are obtained with forgings as compared with castings.
Forgings usually cost less, are more accurate, machine easier, are free from defects and have a better polishing surface.
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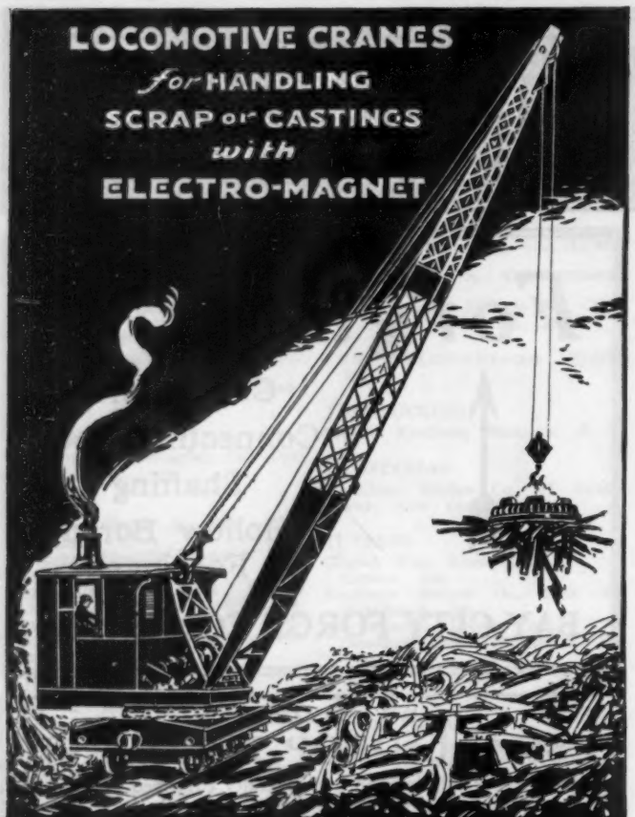
LOCOMOTIVE CRANES
for HANDLING
SCRAP or CASTINGS
with
ELECTRO-MAGNET



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Chicago - Illinois

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cranes
Locomotive—Crawler—Traction
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Equipment for Moving Materials
THE McMYLER-INTERSTATE CO.
CLEVELAND
Sales Offices in All Principal Cities
INTERSTATE

Quick, Positive Control

THE MILWAUKEE CRANE

Instant response to every desire of the operator makes the *"Milwaukee" Crane* ideal for all places where speedy, smooth, reliable service is essential.

May we help you in the economical solution of your hoisting problem?

Automatically oil lubricated

MILWAUKEE
ELECTRIC CRANE & MFG. CORP.
Milwaukee, Wis., U.S.A.

More power at the cutting lips

The WILLIAMS Bucket's perfectly straight leads of closing cable cut down friction at the sheaves—more power is actually delivered at the cutting lips. Write us for complete information.

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Eastern Sales Office: 30 Church St. New York

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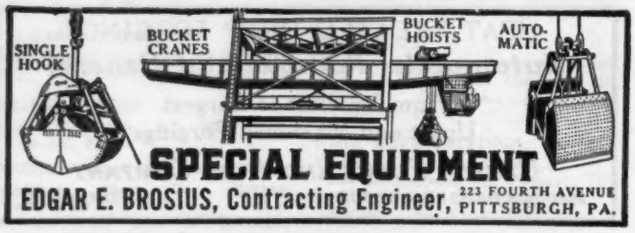
FAST-DIGGING BUCKETS
All Parts Guaranteed Against Breakage



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CLEVELAND CRANES
250 Lbs. to 500 Tons
The Cleveland Crane & Engineering Co.
Wickliffe, Ohio

ERIE PEERLESS BUCKET
A Quick-Acting Digger

Which makes it an all-round contractor's and material handler's bucket.
Built to dig and stand the grief of hard continuous service.
Made in various sizes. Get our Bucket Bulletin.

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358 Schuyler Ave., Montour Falls, N. Y.

SHEPARD
ELECTRIC CRANES & HOISTS

BEDFORD CRANES

Made in all capacities—Overhead or Gantry—to suit individual requirements. Floor, cage or remote control.
Bedford Steel Stiffleg or Guy Derricks.

Bedford Foundry & Machine Co.
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For Your Yard Work

P&H CORDUROY CRANES
Equipped with HOOK, BUCKET or MAGNET
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Successor to Pawling & Harnischfeger Co.
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BUCKETS
for all kinds of digging and rehandling for any crane. Built by Master Builders.
BLAW-KNOX COMPANY
PITTSBURGH PA.

Here is an

Electric Hoist

that makes a Chain Block seem an extravagance.

ROEPER Type "R" Hoists are built in capacities from 500 lbs. to 4000 lbs. with or without trolleys—Cord or Push Button Control.

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CRANES and ELECTRIC HOISTS

"Load Lifter" Electric Hoists
500 Pounds to 5-Tons Capacity

Standardized Heavy Duty Electric Traveling Cranes

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All insulation is Asbestos. They have maximum lifting capacity. Outer ring has no thru holes; it will not loosen, wear out or break.

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Successor to
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Terry Derrick Fittings for general construction work.
AMERICAN-TERRY-DERRICK CO.
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HANNA AIR HOISTS
Price is a small fraction of any other type of Power Hoist
HANNA ENGINEERING WORKS
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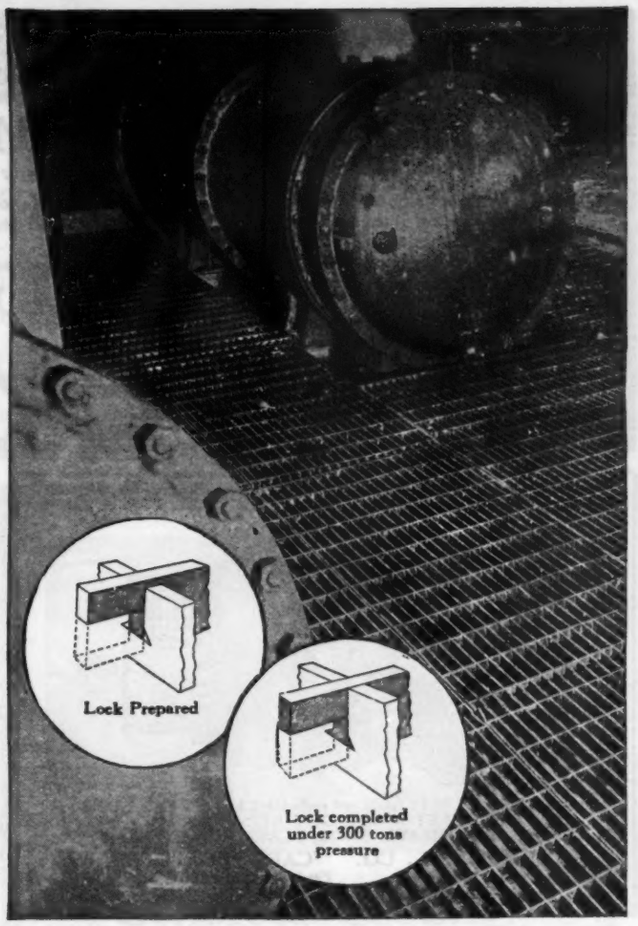

Illustration shows MITCO Grating around the Feed Water Heaters in the Super-Power Station of the Ohio River Edison Company, Toronto, Ohio. Designed and constructed by Stevens & Wood, Inc., New York City.

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-⊡-

The Flooring for Safety and Permanence

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There are many advantages to MITCO Interlocked Steel Grating as a flooring material for industrial plants. It is non-clogging and non-slipping. Oil, grease or water do not make it slippery. MITCO Interlocked Steel Grating stands the strains and stresses of heavy loads. It provides excellent traction for wheeling and trucking and assures safety under foot. Constructed entirely of steel it means permanence in flooring.

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May we serve you?

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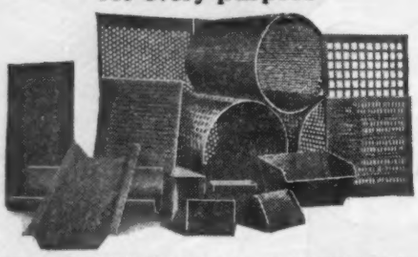
Johnston & Fairmount Aves. **Jersey City, N. J.**

HENDRICK SCREENS

for every purpose



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GENERAL SHEET AND LIGHT STRUCTURAL WORK
LIGHT AND HEAVY STEEL PLATE CONSTRUCTION

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Perforated Metals

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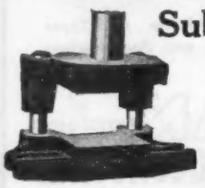
2445 West 24th Place
Tel. Canal 1459 CHICAGO, ILL.



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We are prepared to make anything that you may require in Stampings from sheet steel brass, bronze, copper and aluminum.

We specialize auto parts of every description.

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HIGH GRADE METAL *Stampings*

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DEPT D, WARREN, PA.

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JOLIET WROUGHT WASHER CO.

JOLIET, ILLINOIS

STANDARD WASHERS **SPECIAL WASHERS**

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PERFORATING SHEET METALS

has been our business for 40 years. Broad experience and exceptional equipment permits unusual service on your requirements in Aluminum, Brass, Copper, Steel, Tin, Zinc, etc. for Fanning Mills, Threshing Machines, Electrical Devices, Ventilators, Grills, and Coal and Mining Screens. *Write!*

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WEIRTON STEEL CO.

COPPER BEARING GALVANIZED SHEETS

TIN PLATE — SHEETS — STRIP STEEL

We control every process in the manufacture of these products—
from Iron Ore to Finished Commodity

GENERAL WEIRTON, W. VA. OFFICES

Branch Offices in ALL the Principal CITIES of the WORLD

Superior Hot and Cold Rolled STRIP STEEL

Especially adaptable for difficult drawing.
Uniform in quality and accurate to gauge.
Made in any degree of softness or hardness required.
Extra fine finish for plating.
Let us know your requirements.

Superior Steel Corporation

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General Offices: Union Trust Bldg., Pittsburgh

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WESTERN SALES OFFICE: STEEL SALES CORPORATION 129 S. Jefferson St., Chicago, Ill.
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DETROIT SALES OFFICE: General Motors Bldg., Detroit, Mich.
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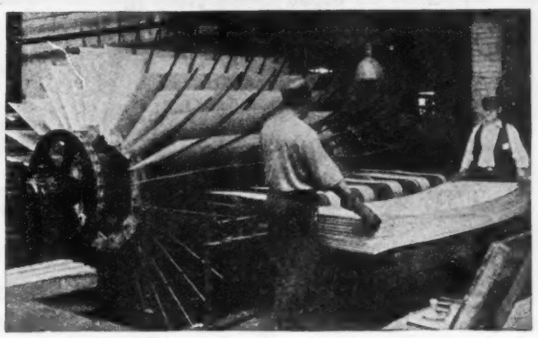

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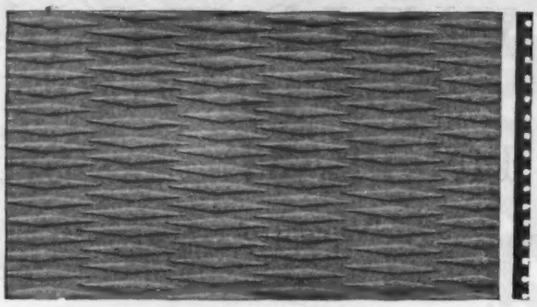

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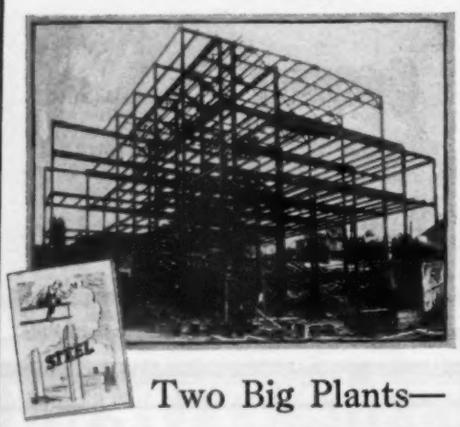

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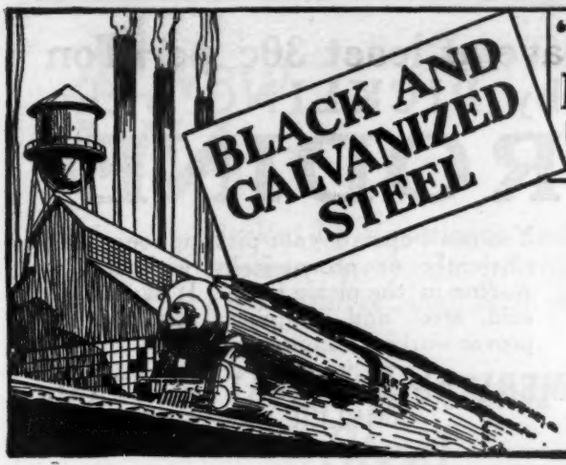

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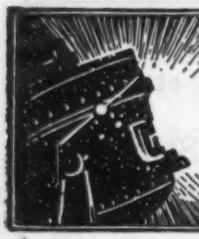
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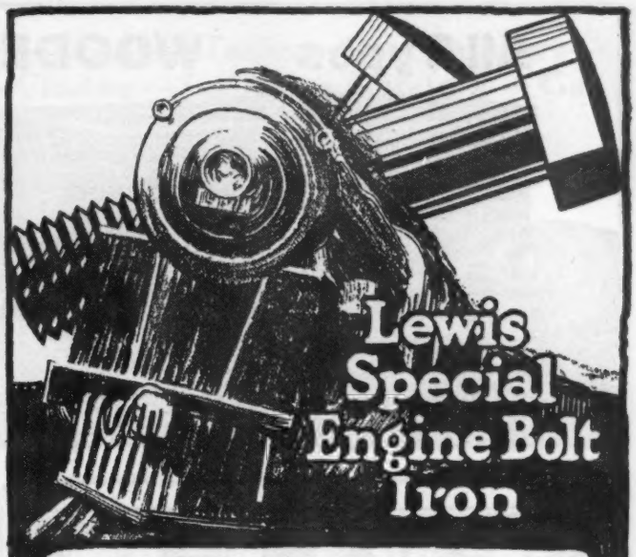

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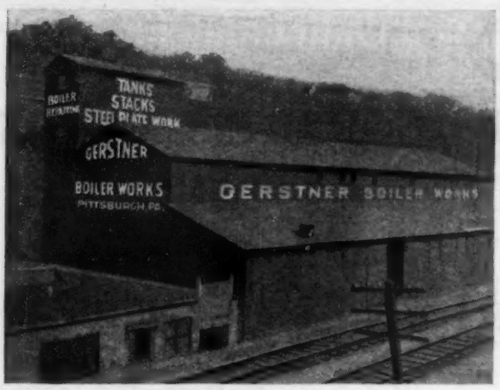

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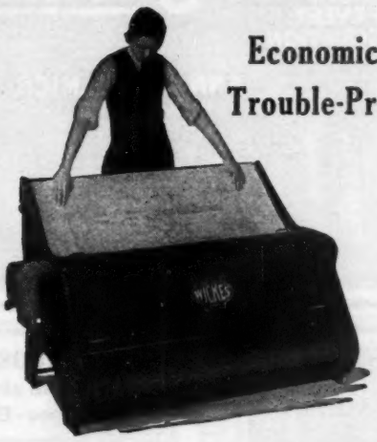

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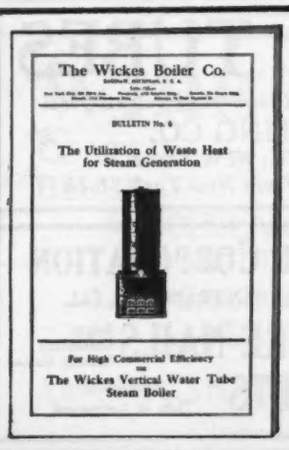
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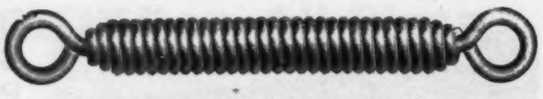

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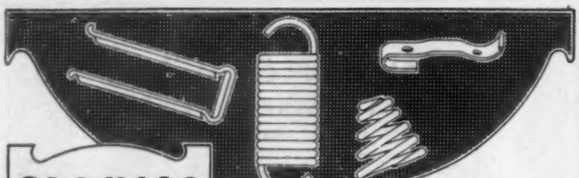

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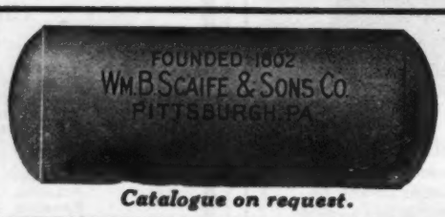

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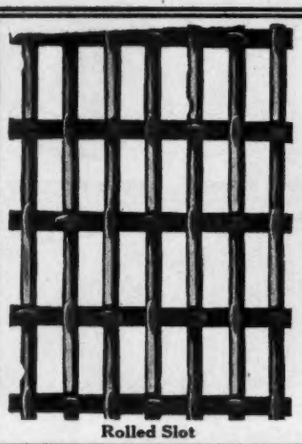

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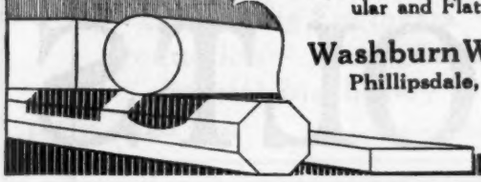

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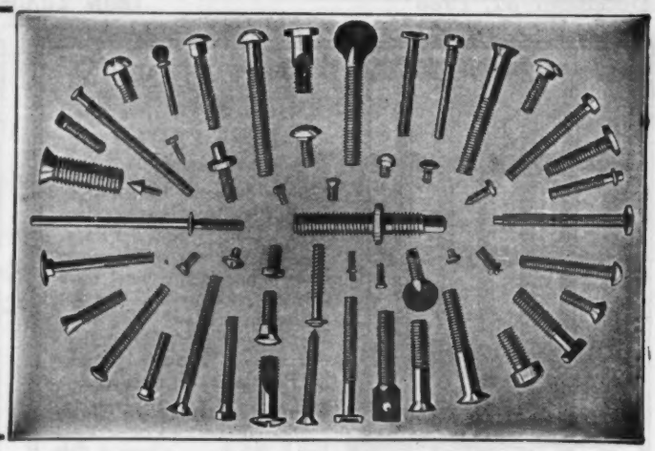

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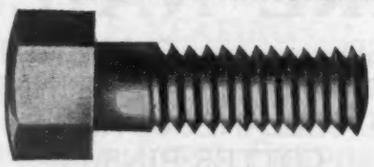

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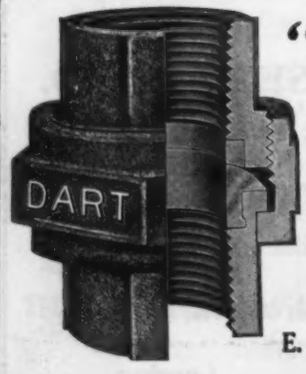

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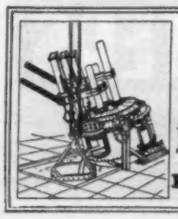

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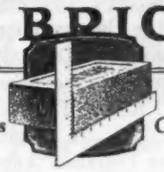

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IRON TRADE REVIEW

Resale Equipment News

Current Announcements and News of Plant Liquidations, Public Auctions of Equipment, Proposals, Bids, Sales, Etc.

December 31, 1925

AFTER 25 years in the machinery and equipment business, and because they are opening an electrical repair shop, Nathan Klein & Co., 208 Center street, New York, industrial equipment operators will liquidate their entire stock. The public auction sale, scheduled to take place Jan. 13-15, at 10 a.m. on the premises, will include disposal of a large number of grinders, drills, pumps, overhead traveling cranes, electric hoists, motors, generators, air compressors, turbines, motor generator sets, gasoline engine generator sets, controllers, circuit breakers, and miscellaneous equipment.

* * *

Robert Collyer representing C. L. Dimon, 24 State street, New York, bid $130,000 for the steamship PRESIDENT ARTHUR of the American-Palestine line. This proved the highest bid at the auction sale conducted by the United States marshal and is subject to confirmation by the federal court, the sale having been ordered to satisfy outstanding liens. There was little competition at the sale.

* * *

Assets, goods and fixtures of the G. M. Johnson Mfg. Co., Jeannette, Pa., manufacturer of mining specialties, were sold recently to Frank J. Lanahan for the sum of $47,942.34. Mr. Lanahan is president of the Fort Pitt Malleable Iron Co., Pittsburgh.

* * *

Arthur C. Bisgood, Bridgeport, Conn., has taken over the machinery end of Gledhill's, an old used machinery house and have also added a number of lines of new machinery and equipment for representation in that territory.

* * *

Acting for an unnamed principal, Frank F. Hall has offered the high bid of $20,200 for the Kruse-Wierk Mfg. Co. factory building at Defiance, O., when the company properties were offered by A. M. Kruse, receiver, at public auction Dec. 14. It is generally believed that the Defiance Automatic Screw Machine Co. is the principal involved in this bid, which must be confirmed in federal court before being accepted.

* * *

Included in the personal property of the Grady Brass Co., bankrupt, to be sold at public auction on the premises in the borough of Mansfield, Tioga county, Pa., Jan. 12, are the following machine tools: Cutting machine, press, boring machines, grinder, saws, drills, lathes, screw machines and miscellaneous machinery.

* * *

Real estate, equipment and plant of the Phoenix Iron Works, Meadville, Pa., were bid in at receivership sale Dec. 11. Frank J. Thomas, acting for Meadville and Pittsburgh interests, obtained the properties for $1100 which, with the existing mortgage of $146,500 and interest thereon since Jan. 1, 1925, makes the purchase price approximately $157,000. It is expected that operations will be resumed.

* * *

Surplus milling machines of the Taft-Pierce Mfg. Co., Woonsocket, R. I., manufacturer of drill jigs and thread milling machines, are being disposed of by Hill, Clarke & Co., Inc., Boston. The listings include both plain and high duty millers.

* * *

Chesapeake Iron Works, Baltimore, Md., is offering for sale a completely equipped manufacturing plant near the center of the city, located on approximately five acres of land and containing some 50,000 square feet of floor space. Plant equipment consisting of heavy duty machine and steel fabricating machinery is included in the offering.

* * *

The recent sale of properties owned by the E. B. Leaf Co., Lebanon, Pa., iron and steel scrap dealer, did not involve in any way the Lebanon yards, executives of the company declare. The public auction concerned a small power plant at Ephrata, Pa., recently purchased by the Leaf company.

* * *

Plant of the Jackson Motor Car Co., Jackson, Mich., said to be valued at approximately $1,000,000, has been ordered sold by Judge A. J. Tuttle to Herbert G. Manley, of Jackson, for the sum of $12,000. The company has been for some time in the hands of receivers, and the purchaser is to assume the outstanding indebtedness.

Sales Calendar

Jan. 12—Grady Brass Co., Mansfield, Tioga county, Pa., public sale at auction by Charles S. Ross, trustee in bankruptcy.

Jan. 13-15—Nathan Klein & Co., 208 Center street, New York, public auction of industrial equipment stock.

Jan. 14—Red Springs Cotton Mill, Lumberton, N. C., sale at auction by R. B. Jennings, receiver, Red Springs, N. C.

Jan. 19—Clydesdale Motor Truck Co., Clyde, O., public auction by Industrial Plants Corp., 25 Church street, New York. Commerce Guardian Trust & Savings bank, Toledo, O., receiver.

Foundry Orders Heavier

Washington, Dec. 29. — Unfilled orders for foundry equipment at the end of October, as reported to the United States department of commerce from manufacturers, fell off in value compared with September, but gained over October, 1925. October shipments and sales each gained over September as well as October, last year. October unfilled orders were valued at $518,795, as against $544,042 in September and $329,061 in October a year ago. Sales showed a total valuation of $424,054 in October, compared with $296,438 in September and $259,871 in October, 1924. Shipments were valued at $400,646 in October, as against $351,121 in September, and $252,580 in October, last year.

Used AND Rebuilt Equipment

For Machine Shops, Foundries, Iron and Steel Works, Mines, Railroads and Metal-Working Plants Generally

Advertising Rates: 1" One Time $5.00, 2" One Time $9.50, 3" One Time $14.00; 4" One Time $18.00
RATES FOR LARGER SPACE OR LONGER PERIODS FURNISHED ON REQUEST

CLOSING OUT THE YEAR—*With* CLOSING OUT PRICES—

In the Plants we are now dismantling.

In former days —Used Tools were bought after they were taken into the Warehouses and overhauled.

Now-a-days —Intelligent Plant Managers buy Used Machinery that doesn't require this overhauling—DIRECT FROM THE SHOPS WHERE USED—at a great deal less expense—eliminating warehouse charges, and overhead of any kind.

We know this—because:

Our experience of 29 years in the Used Machinery business is your guarantee of Reliability

GRINDERS
(plain and universal)

10-in. swing, 36-in. centers "NORTON" Plain. (2)
12-in. swing, 36-in. centers "LANDIS" Plain.
14-in. swing, 72-in. centers "NORTON" Plain. (2)
16-in. swing, 72-in. centers "LANDIS" Plain.
16-in. "LANDIS" Universal.
17-in. swing, 60-in. centers "GISHOLT".
18-in. swing, 96-in. centers "NORTON".
20-in. swing, 96-in. centers "LANDIS" Universal.
30-in. swing, 84-in. centers "DIAMOND".

PIPE AND BOLT MACHINES

Bolt Cutter "PRATT & WHITNEY" 2½-in. capacity, single bed.
Bolt Cutter "ACME" 2½-in. capacity.
Bolt Cutter "ACME" 3-in. capacity.
Bolt Cutter "NATIONAL" 3½-in. capacity.
Pipe Machine, 6-in. "STOVER" Motor Drive.
Pipe Machine, 3-in. "WILLIAMS".
Pipe Machine, 6-in. "WILLIAMS".
Pipe Threading Machine, No. 2 "BIGNALL & KEELER".

SAWS AND CUTTING OFF MACHINERY

8-ft. Straightening and Cutting-off Machine for flat stock.
"HIGLEY" No. 12 Cold Cutting Off, 12-in. blades
"HIGLEY" No. 17 Cold Cutting Off.
STANDARD 36-in. swing Cut Off Saw.
"HIGLEY" 30-in. Cold Saw, motor drive.
"RACINE" 12-in. Hack Saw.
"PEERLESS" 13" x 16" Hack Saw, Motor drive.
"HURBURT & ROGERS" 6-in. Cutting Off Machine.
"HURBURT & ROGERS" 4-in. Cutting Off Machine.
"HURBURT & ROGERS" Rotary Cutting Off Machine.

KEYSEATERS

"MORTON" 30-in.
"MORTON" 24-in.
"MORTON" 24 H.P.

BOILER AND PLATE SHOP TOOLS

12 x 12 Plate Heating Furnace.
48 x 48 Plate Heating Furnace.
"R. D. WOOD" 100 ton Flanging Press, four posts.
"NILES-BEMENT-POND" 24-ft. Plate Planer.
"PAWLING & HARNISCHFEGER" Wall Radial Drill, 14-ft. motor drive.
"WICKES BROS." 48-in. Punch, motor drive.
"CLEVELAND" No. 2 Angle Bending Roll.
"HILLES & JONES" 50-in. Throat Punch, motor drive.
"LENNOX" No. 2 Bevel Shear.
"LENNOX" No. 112 Throatless Shear, arr. motor drive.
"SCULLY" No. 2 Rotary Splitting Shear, arr. motor drive.
"LENNOX" 24-in. Rotary Shear, ½-in. cap., motor drive.
"HILLES & JONES" 16-24 ft. Plate Bending Rolls, motor drive.
"CLEVELAND" 36-in. Shear, motor drive.
"R. D. WOOD" HYDRAULIC RIVETER, 10-ft. gap,with crane.
"HARVEY & PURBELL" Riveting Machine, ⅜".
"AMERICAN" 8-in. Riveter.
"WHITING" No. 6 Punch and Riveter, 20-in. tht.
"R. D. WOOD" 9-ft. gap Bull Riveter, with hoist, etc.
"R. D. WOOD" Accumulator, 10-ft. high, piston 12-in. dia., 12-in. stroke.
Pump for Accumulator 16/2 x 12.
10-ft. Universal Drill, motor drive.
Oil Burning Furnace.
Oil Burning Furnace.
No. 2 "HILLES & JONES" Flange Punch, 3-in. throat.
Two—"MARVEL" Oil Burning Rivet Forges.
No. 3 "AMERICAN BERWICK" Electric Bench Rivet Heater.
Portable Drilling outfit—Dallett.
"THOMPSON" Electric Welding Machine.
Large Grindstone used in boiler-shop.

RADIAL DRILLS

10-ft. arm "POND" Plain, belt drive.
8-ft. arm "NILES".
8-ft. between the housings, Univ. "PRENTICE BROS." for boiler shop use, two univ. head, with Dalett Motor Drive, adjustable heads.
6-ft. arm, "AMERICAN TOOL WORKS" Plain, triple geared, single pulley drive, speed box.
6-ft. arm, "POND".
6-ft. arm, "POND".
6-ft. arm, "POND".
6-ft. arm, "POND".
6-ft. arm, "AMERICAN".
6-ft. arm, "POND" arr. for motor drive.
6-ft. arm, "POND" belt drive.
4-ft. arm, "SIMPLEX" variable speed.
4-ft. arm, "PRENTICE BROS."
4-ft. arm, "BICKFORD" arr. for motor drive.
3-ft. arm, "GRANT" speedy, sensitive.
2½-ft. arm, "SELLERS".
2½-ft. arm, "AMERICAN TOOL WORKS' Universal, speed box, single pulley drive.
2½-ft. arm, "AMERICAN TOOL WORKS' table attached to round column.

See other December issues of "IRON TRADE REVIEW" for balance of list covering the Machinery in these immense Plants now being liquidated.

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1—Used No. 57 Toledo Geared Trim. Press.
1—Used No. 57 Con. Geared Trim. Press.
1—Used No. 55 Toledo Plain Trimming Press.
1—Used No. 57 Consolidated Double Back Geared Trimming Press.
1—Used No. 67 Con. Geared Trimming Press.
1—Used No. 54 Con. Plain Trimming Press.
1—Used No. 206C Toledo D. C. 3" stroke.
1—Used No. 206F Toledo D. C., 3" stroke.
1—Used No. 25-D Bliss D. C., 3" stroke.
1—Used No. 73 Michigan D. C., Gap 2" stroke.
1—Used No. 63 Consolidated S. S., 5" stroke.
1—Used No. 55 D. D. G. Ferracute S. S., 3½" stroke.
1—Used No. 55 Toledo S. S., 3½" stroke.
1—Used No. 54 D. D. G. Ferracute S. S., 3½" stroke.
1—Used No. 126 Stoll Horning, 2" stroke.
1—Used No. 116 Toledo Wiring, 24" stroke.
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3—New No. 1 Loshbough-Jordan O. B. I. standard.
2—New No. 2 Loshbough-Jordan O. B. I. standard.
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1—New No. 5 Loshbough-Jordan O. B. I. standard.
1—New No. 5 Loshbough-Jordan O. B. I. Geared comb.
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3—Used No. 3 Niagara O. B. I., 1½" stroke.
1—Used No. 18 Bliss O. B. I., 1¼" stroke.
1—Used No. 2 Michigan O. B. I., 1½" stroke.
1—Used No. 30 Perkins O. B. I., 2" stroke.
1—Used No. 3 Michigan O. B. I., 1¼" stroke.
1—Used No. 5 Michigan O. B. I., 2" stroke.
1—Used No. 15 Toledo Deep Throat 1" stroke.
1—Used No. 2 Bliss Stiles.
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1—Used Cady Guillotine Shear, cap 4 x ⅜.
Also large stock of Shears, Steam and Board Hammers.

We carry the largest stock in Michigan.

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1 HAMILTON CORLISS ENGINE

Cylinder 20" x 48". Band wheel 16' x 33". This engine has been kept in the highest state of efficiency. Removed because we needed more power.

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Cylinder 18" x 22". Balance wheel 84" x 24½". This engine has been kept in most excellent order. Was removed because we needed more power.

Both above ENGINES can be seen here any time. They will give excellent service.

Also a lot of used PULLEYS and HANGERS in good used condition. Ask for particulars.

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Chicago Air Compressor, 690 cu. ft.
Betts 72", Bullard 51" Boring Mills.
Pond 8', Dreses 4' Radial Drills.
Brown-Sharpe No. 13 Gear Cutter.
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Pond 48" x 48" x 22' Planer, 4 heads.
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Niles 15" Slotter, 30" rotary table.
Excelsior Swaging Machine, cap. 3/16".
Vises, Milling Cutters, Hoists.

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Pittsburgh, Pa.

Air Compressor, 10" x 10" Ingersoll with motor, 3-60-220.
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3—No. 4 WARNER & SWASEY TURRET SCREW MACHINE, BAR FEED, POWER FEED TO TURRET, FRICTION HEAD, LIKE NEW.
Lathe, 60" x 31' Johnson, D.B.G.
Miller, No. 2½ Rockford Universal, S.P.D.
Punch, 24" Cleveland, 1" x ¾", arch. jaw.
Punch, 36" Cleveland, 1¼" x 1", arch. jaw.
Bending Roll, 16' x ¾" Wickes, drop end.
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The following brand new Pipe Coupling Rolling Equipment

1—United Engineering & Foundry Co., No. 1 coupling rolling machine, complete with mandrel, die, rolls, etc., and with one extra set of bushings.
1—B-5 Bevel Shear.
1—Strong Carlisle & Hammond pre-heating furnace, inside dimension 24" x 6' 6".
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An extremely attractive proposition will be made to responsible parties who might be interested in the purchase of this equipment.

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North East Electric Co.,
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FOR SALE

1—6" x 16" Aldrich Vertical Triplex, single acting, outside packed plunger Pump, 1500 lbs. per cubic inch pressure; approximate weight 75,000 lbs.

1—Falk Herring Bone Gear and casing 60 inches centres and 21 inch face, reduction speed six to one, suitable for mill or heavy drive.

The Milton Mfg. Co.
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No. 143 General Electric single stage centrifugal compressor, 4200 cu. ft. against 2 lbs. pressure. 16" suction and discharge, direct driven by 50-60 H.P., Type I, Form K, 220 volt, 3 phase, 60 cycle motor.
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Sirocco Double Blower, direct connected to 75 H.P. DeLaval Steam Turbine, capacity 16,000 cu. ft. against 20" pressure. Suitable for operation on 75 to 150 lbs. steam pressure. Blowers are 54" high and have bottom horizontal discharges 12" by 21".

No. 6½ Connersville Rotary Pressure Blower 20" bottom inlet, 20" top discharge. Double geared both ends. Capacity 49 cu. ft. per revolution, speed to 210 R.P.M.
No. 4 Connersville Rotary Pressure Blower. Capacity 13.1 cu. ft. per revolution, speed to 270 R.P.M.

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Generators, Engines, Boilers, Pumps, Air Compressors.
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Quality Machinery

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1200 *other machine tools, consisting of Lathes, Milling Machines, Shapers, Drill Presses, Power Presses, Boring Mills, Gear Cutters, etc.*

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3 spindle Henry & Wright Drills (K's).
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36" x 30" x 10' Newton Slab Miller.
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IN STOCK AT JERSEY CITY
72" BETTS EXTRA HEAVY DUTY VERTICAL BORING MILL
Motor drive, spur gear drive, power rapid traverse, all geared feeds, swings 76". latest type, weight 50000 lb. excellent condition.

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24" Brown & Sharpe Gear Cutter.
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32" x 20' Rahn Carpenter Engine Lathe.
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4"—6"—8" and 12" Pipe Machines.
400 lb. Beaudry Upright Power Hammer.
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1100 lb. N.B.P. Steam Forging Hammer.
No. 1 Hilles & Jones S.E. Punch and Shear, arch. jaws.
36" Cleveland Style EF Punch and Shear, architectural jaw, motor drive.
15" I beam WICKES Structural Coping and Gang Punching Machines. Motor driven with coping, gang punching and angle shearing tools.

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Bradley Hammer

300 lb. Upright Helve

Serial No. 1274

Diameter of driving pulley 26" face 8"
Upper die not including tongue 4"x11"x3"
Average blows per minute 175-190
Average size iron worked 3½" to 4"
Floor space overall 52"x96"
Horse Power required.....4"
Approximate weight 10,000 lbs.,
Excellent condition, guaranteed.

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BROACHES, Nos. 1, 2, 3 and 3-B LaPointe.
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SHAPER, 24" Gould & Eberhardt High Duty.

Money-Back Guarantee

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Come to New York on Jan. 13-14-15th. We will sell over $300,000.00 worth of Electric Motors, etc., at Public Auction. Wait for this sale. Watch this paper for further information.

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5—No. 0 Full Automatics	Serials—3000.	Each	$ 750.00	Still set up here in Bridgeport. Beautiful machines—No option. We have 20 more No. 00 and No. 0 with lower serials at correspondingly lower prices. Also parts, tools, cams, etc.
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7—No. 2 Full Automatics	Serials—4000.	Each	1000.00	
3—No. 2 Cut-Offs	Serials—4200.	Each	650.00	
1—OG Full Automatic	Serial —4437		1000.00	

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For sale—No. 3 Whiting, shell 50" in diameter, height of stack 45'. Now running. Price $200.00 cash. Can be seen at The West Steel Casting Company, 805 East 70th St., Cleveland, Ohio.

24" Cincinnati Shaper. Motor Drive. New.
62" Bullard Boring Mill. 2 Hds. Belt Drive.
60" Quickwork Rotary Shear. 14 gauge.
12" Jarecki Pipe Machine. Belt Drive.
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100 lb. Mayer Upright Hammer.
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A large quantity of
CRANE RUNWAY GIRDERS
and Rails fabricated for SERVICE
In Stock

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1—20 ton 76' span Shaw Crane, 4 motor, 220V—DC.
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1—2 ton Detroit Hoist, 2 motor, 220V—AC.
11—½ ton. A Box Hoist, 1 motor, 220V—DC.
1—½ ton. A Box Monorail Crane, 2 motor, 220V—AC.
1—5 ton Detroit Hoist, 1 motor, 220V—DC.
10—5 H.P. Lidgerwood single drum hoist, 1 motor, 125V—DC.
1—15 ton Brown Gantry Crane—75' boom.
1—15-20 ton Brown Hoist Locomotive Crane—41' boom.
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"RICHARDSON FOR RAILS"

Constant Stocks of New and Relaying Rails, Spikes and Bolts, Frogs and Switches.

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First quality. Open hearth steel. Other weights. Frogs, switches, bolts, spikes, tie plates, etc.

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Air Compressor

16" and 28" x 25" and 15" x 20" Ingersoll-Rand Cross compound four valve Corliss steam driven two stage AIR Compressor, 1700 cu. ft. capacity. Guaranteed mechanical and operating condition. Ready for immediate shipment from our Jersey City warehouse.

WICKES MACHINERY CO.
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ELECTRODES
(4, 8, 12 and 20 inch)
TRANSFORMERS
(500, 250 and 150 KVA)
SWITCH BOARDS
(Automatic Control)
MOTORS
(3 to 35 H. P.)
MISCELLANEOUS ELECTRICAL EQUIPMENT AND SUPPLIES

For sale separately or as a complete *ELECTRIC FURNACE PLANT* with bldgs., etc., ready to operate. MUST BE SOLD AT ONCE AND CAN BE BOUGHT CHEAP.

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608 Symes Bldg., Denver, Colo.

For Sale

2—New 3-jaw 10 x 3 Cat. No. 439 Foster Barker Wrenchless Chucks for Internal and External Gripping, for No. 4 W. & S. Price, f.o.b. Bridgeport, Conn., $95.00 each.

15—Type V Combs Gyratory Riddles with 1-6 H.P., 220 V., 3 Phase, 60 cycle A.C. motors. First class condition. $100.00 each, f.o.b. Bridgeport, Conn.

JENKINS BROS.
510 Main St.
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Forging Ingots

For Sale—400 tons Open Hearth Forging Ingots—Carbon .25 to .30—Manganese .50 to .77—Sulphur .020 to .033—Phosphorus .010 to .029—weight approx. 935 lb. each, 10" Square at top—8¾" square at bottom—body approx. 36" long—hot top 6" to 8" long. Write for schedule showing analysis of each heat. Immediate shipment from stock.

N. & G. Taylor Co.
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1st Class Condition

2—264 H.P. B. & W. Water Tube, 150 lbs. with Combustion Eng. Co. stokers.
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1—235 H.P. Heinie Water Tube, 125 lbs. with oil burning equipment.
Also—H. R. T., Locomotive, Economic and Vertical.

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Preferred Position, please!

Old timers in advertising will remember that the most "preferred position" thirty years ago was alongside the "Personals."

An advertisement today in the Used and Rebuilt Equipment Section of IRON TRADE REVIEW, no matter on what page, is in a "preferred position."

Readers carefully scan this section each week for good buys in used equipment. They seek to buy. They wait to give you cash for your surplus tools.

What have you to offer them?

617

BOILERS

10—823 H.P. Babcock & Wilcox Stirling Water Tube Boilers, Class M-30, 200 lbs. pressure. Westinghouse stokers, forced draft fans, Vulcan soot blowers and all accessories.
6—400 H.P. Wickes Vertical water tube boilers, 175 lbs. pressure, Murphy stokers. 48" x 90' steel stacks. All accessories.
1—300 H.P. Vogt Water Tube Boiler, 125 lbs. pressure.
2—300 H.P. Heine Water Tube Boilers, 160 lbs. pressure.

NASHVILLE
INDUSTRIAL CORPORATION
Old Hickory, Tennessee

CRANES

3—5 ton, 220 v., 3 motor, 26' span Traveling Cranes; 1700 ft. Crane Runway Girders.

The Pollak Steel Company
Cincinnati, Ohio

No. 19-53" Besly Vertical Spindle Disc Grinder.

Upsetters, Bulldozers, Hammers, Punch Presses, Threading Machines, Shears and miscellaneous forging equipment.

Donahue Steel Products Co.
204 North Jefferson St.
CHICAGO

Good Used MACHINERY

is advertised in this section every week. Each and every machine offered is still capable of long and reliable service in your shop. If you are in need of a lathe, miller, press or any other piece of machinery and cannot afford to invest in a new one at the present time, why not avail yourself of the offerings in this section?

607

Employment

POSITIONS OFFERED Minimum ad., 50 words, $3.00 Additional words, $.06 each

When a box address is desired count seven words in addition to your copy

POSITIONS WANTED Minimum ad., 30 words, $1.00 Additional words, $.03

Positions Offered

PRACTICAL EXECUTIVES

on operation and management of Farm Implement factory. Established Southern firm with prestige and good trade. Substantial investment required. Address Box 659, IRON TRADE REVIEW, Cleveland.

WANTED
METALLURGIST-CHEMIST

who has had experience in foundry practice. Address, stating age, experience, references and salary expected. Mt. Vernon Car Manufacturing Company, Mt. Vernon, Illinois.

SUPERINTENDENTS, EXECUTIVES, ENGINEERS, $3,000-$25,000, find our individual confidential service effective in making desired connections. Personally conducted by MR. JACOB PENN, the eminent employment authority, known to leading business men throughout America. Not agency. Jacob Penn, Incorporated, 305 Broadway, New York.

THE BEST WAY TO GET A GOOD POsition in drafting or engineering is to file application direct with some of our clients who are depending on us to get competent and experienced applicants for their vacant positions. Send stamp for blank and list of vacant position. The Cleveland Engineering Agency Co., Rose building, Cleveland, O.

SALARIED POSITIONS $2,500 TO $25,000 upward; executive, technical, administrative, engineering, manufacturing, professional, financial, etc., all lines. If qualified, and receptive to tentative offers, you are invited to communicate in confidence with the undersigned who will conduct preliminary negotiations. A method is provided through which you may receive confidential overtures, without jeopardizing present connections, and in a manner conforming strictly to professional ethics. Established 1910. Send name and address only for preliminary particulars. No obligation. R. W. Bixby, Inc., 268 Main St. (Suite 810) Buffalo, New York.

GENERAL ENGINEERING AGENCY, LOCK Box 477-N. S., Pittsburgh. Require miscellaneous service proposals for transcontinental employment recommendations. Mechanical Superintendents; Production supervisors, plant engineers, cost clerks; Foundry estimators; Machine builders, tool draftsmen; Chief executive draftsmen, checkers, detailers; Metalurgists; College Instructors.

Positions Offered

First Class
STRUCTURAL STEEL DRAFTSMAN

Plant located in eastern Pennsylvania requires man for a steady position with good chance for advancement. Applicants should state salary expected and give details of past experience. Address Box 665, IRON TRADE REVIEW, Cleveland.

WANTED
CORE ROOM FOREMAN

Thoroughly experienced man required for our electric steel foundry. Applicants should give references, experience and salary desired. Address Box 663, IRON TRADE REVIEW, Cleveland.

Wanted
OPEN HEARTH MELTER

For small plant near Pittsburgh making high grade carbon steel. State past experience, references, etc. Address Box 660, IRON TRADE REVIEW, Cleveland.

INSPECTOR FAMILIAR WITH ALL types and grades of alloy steel; one who can be depended upon, has initiative, knows how to handle men. State age, salary, experience and references. Addrss Box 656, IRON TRADE REVIEW, Cleveland.

Positions Wanted

ASSISTANT SUPERINTENDENT, EXPERIenced in forging, stamping and casting on railway and automobile work, desires executive position. Practical man who has served as chief inspector, foreman and travelling adjustor with up-to-date business training. Opportunity means more than salary or location. Address Box 657, IRON TRADE REVIEW, Cleveland.

ESTABLISHED OHIO REPRESENTATIVE calling on railroads, structural shops, sheet and plate workers, will take one additional good line. Commission basis only. Address Box 661, IRON TRADE REVIEW, Cleveland.

Positions Wanted

TECHNICAL ASSISTANT: — ENERGETIC young mechanical engineer, who has devoted special attention to foundry production on light, medium and heavy work, with considerable experience on design and construction of buildings, steel and plate work, elevating and conveying equipment, furnace and brickwork, piping, etc., in connection with metalworking, crushing, drying, furnace, chemical and power plants; who can apply highly developed technical and inventive ability to development of product or equipment, and who can write interestingly and convincingly on technical and other subjects, is available for responsible position. Address Box 644, IRON TRADE REVIEW, Cleveland.

TRAFFIC MANAGER OR ASSISTANT. Young married man, LaSalle graduate, two years experience, best references. Correspondence solicited. Open for immediate connection. Wm. McKean, 246 Sycamore St., Mansfield, Ohio.

EXECUTIVE:—GRAY IRON FOUNDRY or allied industry. Twenty years practical experience as manager medium sized corporation. Now employed. For detailed information covering experience and for references as to ability and integrity, address Box 655, IRON TRADE REVIEW, Cleveland.

SALES MANAGER

I can show a long successful record with two Nationally known Organizations; have made only two changes in twenty-five years; both were voluntary; have wide acquaintance from Atlantic to Pacific Coast and good standing with Steel and Hardware Trade. I am seeking connection with responsible company having Eastern Headquarters, preferably in or near New York City. Only high class connection will be considered. Address Box 653, IRON TRADE REVIEW, Cleveland.

SUPERINTENDENT-
PLANT MANAGER AVAILABLE

Ten years experience, Foundry and Machine Shops. Seven years with second largest steel corporation in the country. Productive, executive positions. Over three years general manager, foundry, machine shops, manufacturing light automatic and heavy machinery. Capable of taking charge entire plant or superintending gray iron foundry of machine shop departments. Address Box 658, IRON TRADE REVIEW, Cleveland.

Opportunities

Advertisements in this section are referred to by those seeking plants and plant sites, miscellaneous semi-finished and finished raw materials; by those who desire agencies.
Advertising Rates: 1" One Time $5.00; 2" One Time $9.50; 3" One Time $14.00; 4" One Time $18.00

PUBLIC SALE

The undersigned will offer at public sale, at the Court House in Wellsburg, W. Va., on January 2nd, 1926 at one o'clock P.M. the Wellsburg, Bethany & Washington Ry. Company (Electric) consisting of franchises, rights of way and following equipment.

12.5 miles 75 lb. T rails
1.5 " 110 " girder rails
Frogs, switches, turnouts, poles, hangers
13 miles 0000 copper trolley wire
3 passenger cars
2 work cars
Extra armatures
Repair parts
Tools
Sand dryer
Head lights
One steel bridge
Two steel trestles
Miscellaneous material

Wellsburg Banking & Trust Company, Trustee,
Wellsburg, W. Va.

WANTED

Good second hand 36" open side PLANER and 18" LATHE with 14 foot bed. Ladish Drop Forge Co., Cudahy, Wisconsin.

LISTEN!

Opportunity knocks — but you've got to meet her at the door.

Watch these pages!

609

NEWARK, N. J.

FOUNDRY

FOR SALE

Main building brick and steel. 125' x 550'; P. R. R. side tracks; traveling cranes; cupola capacity 100 tons; 8 acres of land.
DAVID HOUSTON, BOND & CO., Inc.
Factory Specialists
192 Market Street Newark, N. J.

WE BUY

SURPLUS STOCKS OF

NUTS, BOLTS, & SCREWS

SEND SAMPLES WITH YOUR LIST
WE PAY CASH AND TOP PRICES.

IMPELLER PUMP CO.
INDIANAPOLIS, IND.

79,000 Square Feet for $60,000.00

COMPLETELY EQUIPPED STEEL FOUNDRY

Cupolas, ovens, boilers, blowers, converters, etc., in place and ready to resume active operation on a few hours notice. On N. Y. P. & N. Railroad and Delaware Bay. Twenty buildings on eighteen acres of water-front property. Main building 62' x 624' with five traveling cranes on craneway of 58' 8" running entire length of building.

TECHNICAL SERVICE CO.
Woolworth Bldg., New York City

WANTED

Wallace 5-H PIPE BENDER
Ryerson Friction SAW

Lafayette Machinery Co.
Lafayette, Indiana

Wanted
MANUFACTURER'S REPRESENTATIVE

Manufacturer's agent or specialty house with entry to factories, railroads, mines, to handle line of mill supplies, cleaning and maintenance materials. Territories still open, Philadelphia, Newark, Baltimore, Boston, Albany. Address Box 651, IRON TRADE REVIEW, Cleveland.

HENRY POTTS & CO.

Iron and Steel Scrap
Obsolete Plants Bought

Bankers Trust Bldg., Phila, Pa.
Yard: Coatesville, Pa.

SPECIALISTS IN

FACTORIES

FOR SALE OR LEASE

Have professional engineers with extensive plant experience who can therefore appreciate your requirements, aid you in locating a suitable factory or manufacturing industry.
TECHNICAL SERVICE COMPANY
233 Broadway, N. Y. C. Whitehall 8412

MISCELLANEOUS EQUIPMENT

which may be taking up valuable space in your plant without being made use of, can be disposed of through IRON TRADE REVIEW.

CASH IN

645

If you have idle machines find work for them.

Fill-in and Contract Work

CASTINGS — FORGINGS — STAMPINGS — PATTERNS
MACHINE PRODUCTS — DIES, JIGS, FIXTURES and TOOLS

Put those

IDLE TOOLS

to work

Through the Fill-in and Contract Work Section you can locate outside work that will keep those presses in motion or fill up that surplus capacity in the foundry.

Rates for advertising here are only $3.75 for a one inch card on the yearly basis. Other spaces in proportion.

Why not permit Iron Trade Review to act as a salesman of your services? Why not get started with the next issue?

A Manufacturing Service of Broad Scope

Few organizations can offer the plant capacity and the variety of facilities for precision work on a contract basis.
Eighty years of manufacturing experience and a complete modern organization are at your command.

Engineering and Designing Service
Chemical and Metallurgical Laboratories
Pattern Shops
Brass and Iron Foundries

Tool Rooms
Machine Shops
Gas and Electric Furnaces
Bakelite, Rubber and Porcelain Departments
Etc.

Write for particulars—Industrial Division

The S. S. White Dental Mfg. Co.
152 West 42nd Street New York, N. Y.

Machining—Fabricating

We have a completely equipped machine and steel fabricating shop for medium heavy work. We solicit your specification for machine and steel plate work or tanks of any kind.

THE SMITH GAS ENGINEERING CO.
Dayton, Ohio

HOT DIP GALVANIZING

We have the largest hot dip job galvanizing plant and kettles in the United States.
We have the most modern equipment to do first class galvanizing at lowest prices. Galvanized Products Furnished.

Prime Western Zinc used exclusively
Send us your inquiries

Joseph P. Cattie & Brothers
Gaul and Letterly Streets
PHILADELPHIA

DOWNINGTOWN MFG. CO.

East Downingtown, Pa.
High Grade Gray Iron and Brass
CASTINGS
Pattern and Machine Work solicited
Quality and Service our motto

Small Iron Castings *of* Every Description

We Make, Machine, Finish, Polish, Plate and Assemble parts. Quantity production a specialty. Send sample for prices.
GRAY IRON FOUNDRY CO.
Established 1903
Reading, Penna.

FORTY-SIX YEARS
have elapsed since we first produced
PRESSED METAL PARTS
Economical—Light—Clean
Peter Gray & Sons Company
Cambridge, Mass.
"Started in 1878 and Growing Yet"

YOU MAY BE OVERlooking a money-saving opportunity if you fail to read the advertisements in this Section each week.
603

WE BUILD SPECIAL MACHINERY

Complete Foundry, Machine, Pattern, and Forging Equipment, and over 40 years' experience. Specialists in building medium weight machinery. Send blue prints and specifications.
Hill-Curtis Company
Kalamazoo, Mich.

"If a man can do business, he should let it be known"—Ben Franklin

Fill-in and Contract Work

CASTINGS—FORGINGS—STAMPINGS—PATTERNS
MACHINE PRODUCTS — DIES, JIGS, FIXTURES and TOOLS

CASTINGS

ALABAMA

INTERSTATE FOUNDRY CO., Anniston. High grade soft gray iron. Present daily production fifty tons. Machine and pattern shop.

CONNECTICUT

THE BRADLEY & HUBBARD MFG. CO., Meriden. Gray iron, bronze, brass and aluminum fine quality. Machined and finished as desired.

THE BULLARD MACHINE TOOL CO., Fdry. Div., Bridgeport. Quality castings, gray iron or high tensile semi-steel. Independent foundry control.

NELSECO FOUNDRY, New London. Gray iron; 50% steel, 5 lbs. to 10 tons. Superior steel castings up to 2,000 lbs. Machine work.

THE SESSIONS FOUNDRY CO., INC., Bristol. Gray iron from smallest to thirty tons. Pattern and machine shop.

I. S. SPENCER'S SONS, INC., Guilford. Gray iron, brass and bronze castings, machined, japanned or plated. Screw machine products.

DELAWARE

DEEMER STEEL CASTINGS CO., Washington Boulevard, New Castle. Small and medium size steel castings.

ILLINOIS

CHALLENGE CO., Batavia, (35 miles west of Chicago). Medium and heavy gray iron castings, also semi-steel. Machine and pattern shop.

CHICAGO STEEL FOUNDRY CO., Chicago, Kedzie Ave. & 37th St. Electric furnace steel castings of the highest quality.

EGYPTIAN IRON WORKS, Murphysboro. Gray iron and semi-steel castings, 5 lbs. to 2500 lbs. Machine and pattern shop.

HAVANA MANUFACTURING CO., Havana. Gray iron and semi-steel castings, rough or finished. Machine and pattern shop.

ILLINOIS FOUNDRY CO., Springfield. Light and medium gray iron and semi-steel castings. Pattern shop.

THE MOLINE FOUNDRY & MACHINE CO., Moline. Gray iron castings from one ounce to two tons. Machine and pattern shop.

A. PLAMONDON MFG. CO., Chicago, 5301 South Western Blvd. Gray iron castings. Machine and pattern shop.

WANNER MALLEABLE CASTINGS CO. Certificate malleable castings for all uses. Also metal pattern shop. Wanner steel castings, Bosshardt process. Works, Hammond, Ind.; Beloit, Wis.

CASTINGS

INDIANA

ALEXANDRIA METAL PRODUCTS CO., Alexandria. Brass, bronze, copper and aluminum castings and bushings. Electro melt process.

ALUMINUM FOUNDRY CO., South Bend. Production work in aluminum castings only.

BERTSCH & CO., Cambridge City. 500 to 40,000 lbs. gray iron or semi-steel. Pattern work and machine shop.

ELKHART IRON WORKS, Elkhart. Cast iron blow off tanks. Cast iron Elkhart No. 9 rocking and dumping grates. High grade gray iron castings.

HARTIG FOUNDRY CO., Evansville. Light and medium, soft or chilled gray iron castings. Cored stove work a specialty. Quantity production.

HUBBARD STEEL FOUNDRY CO., East Chicago. Steel castings up to 100,000 lbs. sand iron and chilled iron rolls.

KENDALLVILLE FOUNDRY CO., Kendallville. Can fill orders from patterns to completed castings in gray iron, semi-steel, brass, bronze and aluminum.

THE MAL-GRA CO., Cambridge City. Manufacturers of highest grade malleable iron.

MARION MACHINE, FOUNDRY & SUPPLY CO., Marion. Gray iron, semi-steel up to 20,000 lbs. Building specialties; pattern and machine work.

MUNCIE MALLEABLE FOUNDRY CO., Muncie. Malleable iron castings for all purposes.

RELIANCE FOUNDRY CO., Richmond. High quality gray iron and semi-steel castings, one to five tons. Let us quote you prices.

VULCAN FOUNDRY, Evansville. Light and medium, soft or chilled gray iron castings. Quantity production. Well equipped pattern and mach. shops.

WANNER MALLEABLE CASTINGS CO. Certificate malleable castings for all uses. Also metal pattern shop. Wanner steel castings, Bosshardt process. Works, Hammond, Ind.; Beloit, Wis.

IOWA

CENTRAL FOUNDRY CO., Marshalltown. Light and medium gray iron. Pistons and auto acces. Smooth finish. Quantity with quality production.

DAVENPORT MACHINE & FOUNDRY CO., Davenport. Heavy gray iron and semi-steel to ten tons. Mfgrs. of "Davenport" Molding Machines.

DES MOINES FOUNDRY & MACHINE CO., Des Moines. Gray iron, light and heavy. 50 tons per day. Brass, aluminum. Pattern, machine shop.

EAGLE IRON WORKS, Des Moines. Heavy gray iron and semi-steel castings. Machine, pattern shop; special machinery and steel work.

MURRAY IRON WORKS CO., Burlington. Heavy gray iron castings. Machine, pattern shop, steel plate work.

KANSAS

LAWRENCE IRON WORKS, Lawrence. Gray iron, brass, bronze, alum. castings, machine and pattern shop. Builders special machinery.

CASTINGS

KENTUCKY

THE DRUMMOND MANUFACTURING CO., Louisville, 1214 West Main St. Gray iron, semi-steel castings. Production work desired. Quick shipments.

W. C. HEIMBUECHER & CO., Louisville. Malleable iron and electric steel castings. Machine shop. Wood and metal patterns.

VOGT BROTHERS MFG. CO., Louisville, 1402 West Main St. Gray iron and semi-steel castings, all weights. Pattern and machine shop.

MARYLAND

AMERICAN FDRY. & MFG. CO., Frederick. Gray iron and semi-steel castings, 1 oz. to 10,000 lbs Machining, galvanizing, engineering.

MASSACHUSETTS

ELECTRIC STEEL PRODUCTS CO., Turners Falls. Electric steel castings up to 200 lbs.

MICHIGAN

ACME STAMPING & BRASS WORKS, Zeeland. Brass and alum. castings, either plain or mach. and N.P. We make them for less—saving is yours.

ALPENA INDUSTRIAL WORKS, Alpena. Gray iron castings, 2,000 lbs. or less. Pattern shop and machine shop well equipped.

AUTO SPECIALTIES MFG. CO., St. Joseph. Highest grade malleable castings, either plain or machined, and finished to blue print.

BENTON HARBOR MALLEABLE FOUNDRY CO., Benton Harbor. Reliable malleable castings plain or machined, to blue print.

ENTERPRISE BRASS WORKS, Muskegon. Bronze and aluminum castings. Plumbers brass goods.

FAY FOUNDRY CO., St. Joseph. High grade charcoal iron machinery castings.

LAKE SHORE ENGINE WORKS. Marquette. Gray iron castings up to fifteen tons. Pattern shop and machine shop.

REED FDRY. & MACH CO., Kalamazoo. Light steel castings from one ounce to 1000 lbs. Specializing in Vanadium steel.

RIVERSIDE FOUNDRY & GALVANIZING CO., Kalamazoo. Medium and light weight high grade gray iron. Also hot dipped galvanized castings.

MINNESOTA

MINNEAPOLIS STEEL & MACHINERY CO., Minneapolis. Quality gray iron castings; pattern machine, metallurgical facilities.

Fill-in and Contract Work

CASTINGS — FORGINGS — STAMPINGS — PATTERNS
MACHINE PRODUCTS — DIES, JIGS, FIXTURES and TOOLS

CASTINGS

MISSOURI

THE BAYER CO., St. Louis, 4087 Park Ave. Brass, bronze, monel metal and aluminum castings. Finishing if desired. Capacity 10 tons daily.

A. GILBERT & SONS BRASS FOUNDRY CO., St. Louis. Castings in brass, bronze and aluminum. Patterns, finishing, babbitt metal solder.

THE WHITE IRON CASTINGS CORP., St. Louis. Sand cast hard white iron castings of every description resisting heat and abrasion.

NEW JERSEY

GEORGE KROUSE, Jersey City, 150 Morgan St. Brass and bronze castings, 1 lb. to 4,000 lbs. Aluminum, all sizes and weights. Fair prices.

LUTZ CO., INC., Camden. Gray iron. Unusual pattern-making and machine shop service. Contract for finished product. Specialize in jigs and fixtures.

PHOENIX BRASS FOUNDRY, Irvington (Newark). Production castings, brass, composition and aluminum. Modern equipment; machine shop.

RIVERSIDE STEEL CASTING CO., Newark. Acid open hearth castings up to 10,000 pounds.

SCHANTZ & ECKERT CO., Perth Amboy. Gray iron, semi-steel, brass and aluminum. Marine work a specialty.

WEST BERGEN IRON FOUNDRY, Jersey City, 21-27 Pollock Ave. Soft gray iron castings up to 5 tons each.

NEW YORK

ACME STEEL & MALLEABLE IRON WORKS INC., Buffalo. High grade malleable, gray iron and open hearth steel.

ADAMS FOUNDRY, Rome. Gray iron and semi-steel, 1 lb. to 3 tons. Wooden patterns. Machine shop.

BUFFALO BRONZE DIE CAST CORP., Buffalo, 100 Arthur St. Brass and bronze sand castings. Furnished to close tolerances.

BUFFALO FOUNDRY & MACHINE CO., Buffalo. Gray iron, semi-steel and special mixture castings, 1 to 200 tons. Pattern and machine shop.

E. R. CALDWELL & SON BRASS CO., INC., Syracuse. Brass, aluminum, bronze, bearing alloy castings. Pattern and machine shop.

CHEMUNG FOUNDRY CORP., Elmira. Dependable gray iron castings; analyzed daily to insure strong, soft metal. Modern molding machines.

FARRAR & TREFTS, INC., Buffalo, 67 Perry St. Gray iron, 1 lb. to 50 tons. Semi-steel, chemical and chilled castings. Manholes and grates.

FRONTIER BRONZE CORP., Niagara Falls. Titanium, aluminum, bronze, copper, aluminum, brass castings. Bronze bushings in stock.

GIFFORD-WOOD CO., Hudson. Gray iron castings up to five tons. Bench, machine and floor work. Castings machined if desired. Prompt delivery.

CASTINGS

NEW YORK

LOUGH BROTHERS, New York, 90 West St. Gray iron, malleable, steel, brass, bronze and aluminum. Rough or machined and finished.

MARCY FOUNDRY CO., New York, 74 Beekman St. Light gray iron castings; machining facilities. Foundry at Perth Amboy, N. J.

MENEELY BRASS & BRONZE CO., INC., Watervliet, 1537 Broadway. Brass, bronze and aluminum castings of first class quality.

METAL & ALLOY SPECIALTIES CO., INC., Buffalo. Brass, bronze, aluminum, monel metal, copper, nickel bronze. Pattern, mach. shop.

NAYLOR BROS., Peekskill. Gray iron up to 4 tons. Machine and pattern shop. Pulley castings and hangers. Daily boat service to New York City.

SHERWOOD MFG. CO., Buffalo, 1701 Elmwood Ave. Brass and bronze castings to your specifications Complete machining facilities.

SWEET & DOYLE FOUNDRY & MACHINE CO., Troy, Green Island. Specializing in med. and heavy gray iron mchy. castings up to 10 tons. Pattern, machine, engineering shops.

A. L. SWETT IRON WORKS, Medina. Plumbers specialties, street castings and genera gray iron castings. Machine work. Specialties.

SYRACUSE CHILLED PLOW CO., INC., Syracuse. Chilled iron castings of superior quality, unexcelled for hardness, smoothness and strength.

OHIO

THE ACME-PALMERS & DEMOOY FOUNDRY CO., Cleveland, 5271 Sweeney Ave. Light and medium weight gray iron castings.

THE AMERICAN CRUCIBLE PRODUCTS CO., Elyria. Brass, bronze and aluminum castings. Machined parts. Mill brasses a specialty.

THE AMERICAN MALLEABLE CASTINGS CO., Marion. Certified malleable iron castings for all purposes.

THE ARMSTRONG MFG. CO., Springfield. Gray iron and 50% or more open hearth steel castings, 1 to 10,000 lbs. Pattern, machine shops.

BUCKEYE IRON & BRASS WORKS, Dayton. Brass and aluminum. Valve castings a specialty. Castings machined if desired.

THE CINCINNATI STEEL CASTINGS CO., Cincinnati. Queen City and Spring Grove Aves. Electric process steel castings only.

THE COMMERCIAL STEEL CASTING CO., Marion. Acid open hearth steel castings 5 lbs. to 10 tons. Shipping facilities on five railroads.

CRUCIBLE STEEL CASTING CO., Cleveland. Electric steel castings. Specialize in nickel-chrome alloys for abrasive wear and high ultimates.

THE CUYAHOGA FOUNDRY CO., Cleveland. Gray iron and semi-steel; machine tool and pressure tested castings.

THE JOSEPH DICK MFG. CO., Canton. Gray iron and semi-steel castings of all kinds. Soft gray iron a specialty.

CASTINGS

OHIO

THE EBERHARD MFG. CO., Cleveland, 2734 Tennyson Rd. Light malleable iron castings for automobile and general purposes.

THE ELBEL COMPANY, Canton. Small Malleable Iron Castings and Brass Castings.

THE EUCLID FOUNDRY CO., Euclid, (near Cleveland). Gray iron up to 6 tons. Strictly a job foundry, organized for service on small orders.

THE FOREST CITY FOUNDRY & MFG. CO., Cleveland. Light gray iron castings and warm air furnaces.

THE G. & C. FOUNDRY CO., Sandusky Light and medium weight soft gray iron and semi-steel castings.

HAVEN MALLEABLE CASTINGS CO., Cincinnati. Light malleable iron castings for automobile and hardware purposes.

THE MACHINED STEEL CASTING CO., Alliance. Acid open hearth steel castings, 1 lb. to 100,000 lbs. each. Castings machined if desired.

THE MIDWEST CASTING CO., Middletown. Makers of malleable iron castings of every description. Either jobbing or productive basis.

W. R. McDONOUGH & CO., Cleveland, 628 National Bldg. Steel, malleable and gray iron castings, one ounce to 150,000 lbs. all specifications.

THE OHIO STEEL FDRY. CO., Springfield. Lima, Bucyrus. Large open hearth steel castings, Light electric steel, finished steel, alloy castings.

THE SILVER MFG. CO., Salem. Gray iron castings, light and medium. Machined if desired.

THE SPRINGFIELD ALUMINUM PLATE & CASTINGS CO., Springfield. Aluminum castings and match plates. First class work.

PENNSYLVANIA

ALLEN MACHINE CO., Erie. Gray iron castings up to 50 tons. Chilled iron rolls. Machine and pattern shop.

AMERICAN ENGINEERING CO., Philadelphia. Aramingo & Cumberland Sts. Gray iron and semi-steel from 1 to 24,000 lbs. Long and varied experience.

AMERICAN MANGANESE BRONZE CO., Philadelphia. Every commercial grade; specialists high test and heavy. Pattern and machine shops.

CLEARFIELD MACHINE CO., Clearfield. Clay working and ore reduction machinery. Heavy gray iron and semi-steel castings, rough or finished.

CONFER, SMITH & CO., INC., Hamburg Light gray iron, jobbing, stove repairs, plumbing specialties. Equipped with sand blast.

DAVIES & THOMAS CO., Catasauqua, (N. Y Office, 342 Madison Ave.) Gray iron up to 10,000 lbs. Complete machine and pattern shops.

THOMAS DEVLIN MFG. CO., Philadelphia, Third St. & Lehigh Ave. Malleable and soft gray iron castings.

FORT PITT STEEL CASTING CO. McKeesport. Specializing in accurate, uniform electric steel castings of every description.

Fill-in and Contract Work

CASTINGS — FORGINGS — STAMPINGS — PATTERNS
MACHINE PRODUCTS — DIES, JIGS, FIXTURES and TOOLS

CASTINGS

PENNSYLVANIA

GRAY IRON FOUNDRY CO., Reading. Specializing on small castings of every description for machining or hand molded, tumbled or sand blasted.

HOWARD STOVE CO., Beaver Falls. Gray iron, 1 to 50 lbs. Exceptionally high grade as to finish and machining qualities.

IDEAL FOUNDRY & MACHINERY CO., Beaver Falls. Gray iron, 1 lb. to 5 tons. Brass and aluminum castings, pattern and machine shops.

JOHNSON BRONZE CO., New Castle. Brass and bronze castings, both machined and finished. From ½ lb. to 100 lbs. finished; ½ lb. to 1000 lbs. rough.

KENNETT FOUNDRY & MACHINE CO., Kennett Square. Chilled and gray iron castings, light and up to 5 tons. Machine, pattern shops.

KEUBLER FOUNDRIES, INC., Easton. Refined Malleable Iron Castings, every description. Motor Truck, Auto, Railway Car, Trackwork.

LANCASTER FOUNDRY CO., Lancaster. Malleable castings, rough or machined, tinned or galvanized. Complete pattern department.

LOCOMOTIVE STOKER CO., Pittsburgh. Gray iron, semi-steel, brass, bronze and aluminum Pattern and machine shop.

McGANN MFG. CO., INC., New York, Box 326. Gray iron and semi-steel castings up to 15,000 lbs. Dryers, lime kilns, hydrators, complete equipment.

MARION MACHINE, FOUNDRY & SUPPLY CO., Scottdale. Gray iron, semi-steel, up to 20,000 lbs. Building specialties; pattern, machine work.

MEADVILLE MALLEABLE IRON CO., Meadville. High grade malleable castings from refined air furnace iron. Pattern and machine shop.

MESTA MACHINE CO., Pittsburgh. Heavy iron and steel castings. Chilled, sand, steel and alloy steel rolls. Machine molded gears.

NATIONAL FOUNDRY CO., Erie. Steel castings of all descriptions. Pattern and machine shop in connection.

NORTH WALES MACHINE CO., INC., North Wales. Gray iron, superior quality machine or hand molded, sand blasted, pickled or tumbled.

PENN FOUNDRY & MFG. CO., Reading. Gray iron and semi-steel up to 3000 lbs. rough or machined. Cylinders, pistons, and intricate core work.

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VIRGINIA

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CASTINGS — FORGINGS — STAMPINGS — PATTERNS
MACHINE PRODUCTS — DIES, JIGS, FIXTURES and TOOLS

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OHIO

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